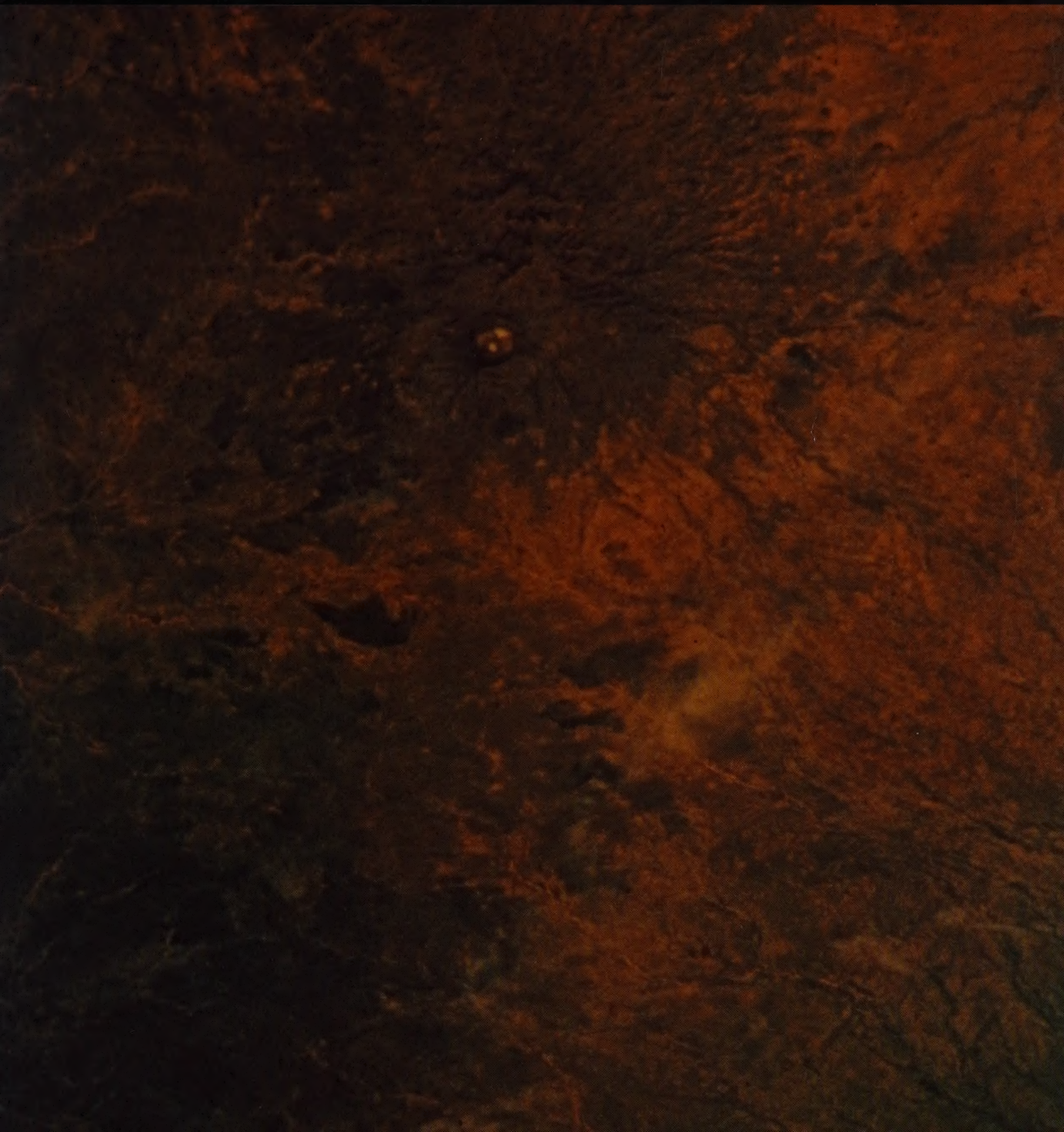


Jebel Marra

G. E. Wickens

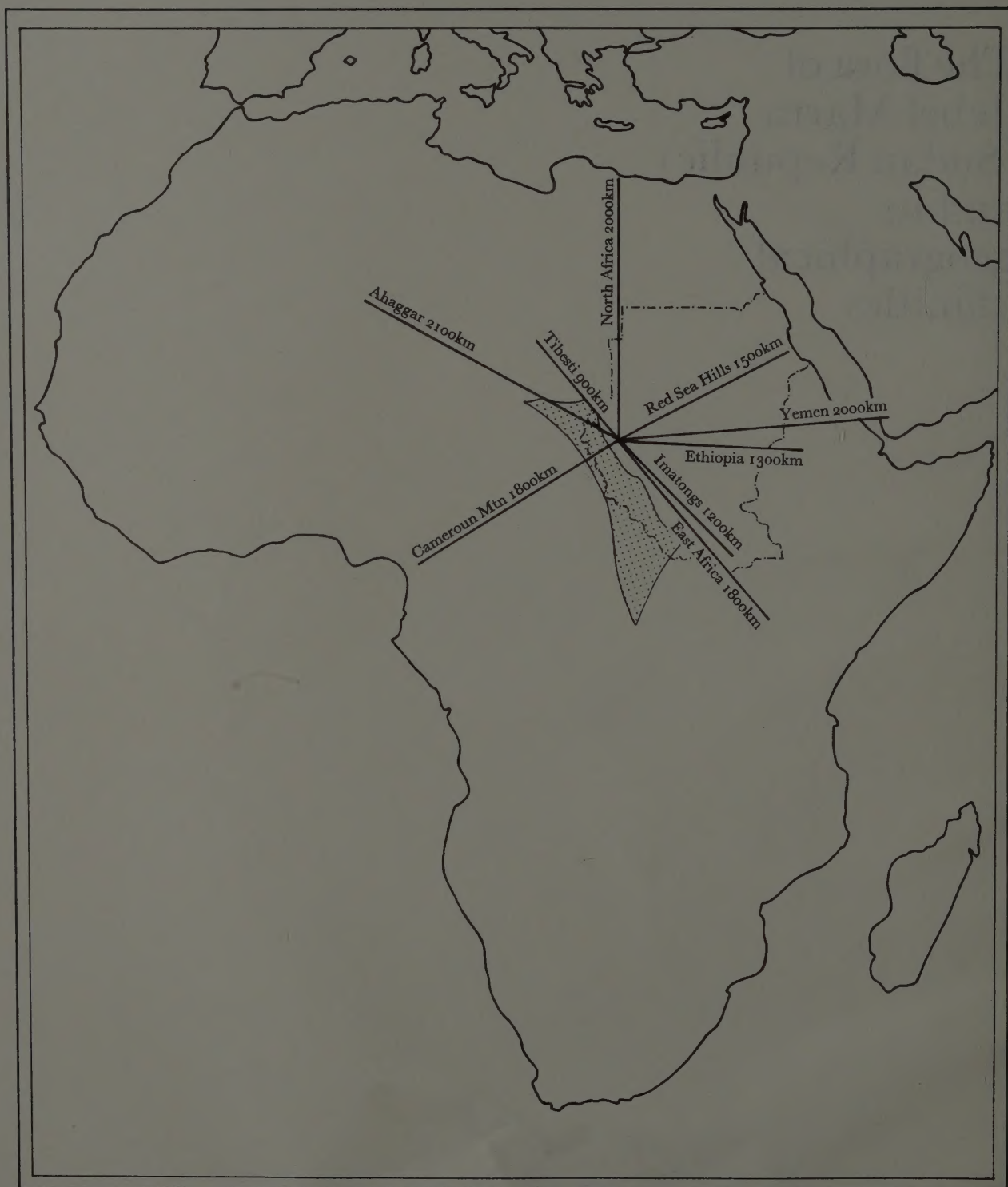


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The flora of
Jebel Marra
(Sudan Republic)
and its
geographical
affinities



The Flora of Jebel Marra (Sudan Republic) and its geographical affinities

G. E. Wickens BSC, MSC, PHD, FLS, FRGS

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Cover

Gemini VI Satellite photograph of Jebel Marra.

The sand sheet to the east of the massif is clearly shown.

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- 2 [2] *Clematis simensis* Fresen.
- 3 [4] *Ranunculus multifidus* Forsk.
- 4 [5] *Ceratophyllum demersum* L.
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- 15 [17] *Capparis decidua* (Forsk.) Edgew.
- 16 [18] *Capparis fascicularis* DC. var. *fascicularis*
- 17 [20] *Capparis sepiaria* L. var. *fischeri* (Pax) DeWolf
- 18 [21] *Cleome monophylla* L.
- 19 [22] *Crateva adansonii* DC. subsp. *adansonii*
- 20 [24] *Maerua angolensis* DC.
- 21 [25] *Maerua oblongifolia* (Forsk.) A.Rich.
- 22 [26] *Maerua pseudopetalosa* (Gilg & Bened.) DeWolf
- 23 [27] *Capsella bursa-pastoris* (L.) Medic.
- 24 [28] *Farsetia longisiliqua* Decne.
- 25 [29] *Farsetia stenoptera* Hochst.
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- [32] *Nasturtium officinale* R.Br.
- 27 [34] *Polygala abyssinica* R.Br. ex Fresen.
- 28 [38] *Securidaca longepedunculata* Fresen.
- 29 [39] *Crassula pentandra* (Royle ex Edgew.) Schoenl.
- 30 [40] *Crassula pharnaceoides* Fischer & C. A. Mey.
- 31 [41] *Kalanchoë lanceolata* (Forsk.) Pers. var. *lanceolata*.
- [42] *Kalanchoë lanceolata* (Forsk.) Pers. var. *glandulosa* (Hochst. ex A.Rich.) Cuf.
- 32 [43] *Umbilicus botryoides* Hochst. ex A.Rich.
- 33 [44] *Vahlia dichotoma* (Murray) Kuntze
- 34 [45] *Tristachya trifaria* (Bory de Saint-Vincent) Spreng.
- 35 [46] *Arenaria leptoclados* (Reichb.) Guss.
- 36 [47] *Cerastium fontanum* Baumg. subsp. *triviale* (Link) Jalas
- 37 [48] *Cerastium octandrum* Hochst. ex A.Rich.
- 38 [49] *Drymaria cordata* (L.) Willd. ex Roem. & Schultes
- 39 [50] *Minuartia filifolia* (Forsk.) Mattfeld
- 40 [53] *Silene burchellii* Otth ex DC.
- 41 [54] *Silene lynesii* Norman
- [55] *S. macrosolen* Steud. ex A.Rich.
- S. villosa* Forsk.
- 42 [67] *Rumex bequaertii* De Wild.
- 43 [68] *Cometes abyssinica* R.Br.
- 44 [74] *Aerva javanica* (Burm.f.) Juss. ex Schult.
- 45 [86] *Linum strictum* L. subsp. *corymbulosum* (Reichenb.) Rouy

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- 46 [88] *Erodium malacoides* (L.) L'Hérit.
- 47 [89] *Geranium ocellatum* Jacquem. ex Cambess.
- 48 [102] *Woodfordia uniflora* (A.Rich.) Koehne
- 49 [114] *Casearia barteri* Masters
- 50 [116] *Adenia venenata* Forsk.
- 51 [126] *Zehneria minutiflora* (Cogn.) Jeffrey
- 52 [130] *Derosiphia tubulosa* (Sm.) Raf.
- 53 [131] *Anogeissus leiocarpus* (DC.) Guill. & Perr.
- 54 [132] *Combretum aculeatum* Vent.
- 55 [135] *Combretum glutinosum* Perr. ex DC.
- 56 [138] *Guiera senegalensis* J.F.Gmel.
- 57 [139] *Terminalia brownii* Fresen.
- 58 [140] *Terminalia laxiflora* Engl.
- 59 [141] *Hypericum perforatum* L.
- 60 [153] *Dombeya quinqueseta* (Del.) Exell var. *quinqueseta*
- 61 [155] *Sterculia setigera* Del.
- 62 [160] *Azanza garckeana* (F.Hoffm.) Exell & Hillcoat
- 63 [178] *Andrachne aspera* Spreng.
- 64 [179] *Bridelia ndellensis* Beille
- 65 [186] *Euphorbia nubica* N.E.Br.
- 66 [196] *Bauhinia rufescens* Lam.
- 67 [204] *Piliostigma reticulatum* (DC.) Hochst.
- 68 [210] *Acacia mellifera* (Vahl) Benth. subsp. *mellifera*
- 69 [211] *Acacia nilotica* (L.) Willd. ex Del. subsp. *nilotica*
- [212] *Acacia nilotica* (L.) Willd. ex Del. subsp. *adansonii* (Guill. & Perr.) Brenan
- 70 [213] *Acacia nubica* Benth.
- 71 [215] *Acacia senegal* (L.) Willd. var. *senegal*
- 72 [216] *Acacia seyal* Del. var. *seyal*
- 73 [217] *Acacia sieberana* DC. var. *sieberana*
- [218] *Acacia sieberana* DC. var. *villosa* A.Chev.
- [219] *Acacia sieberana* DC. var. *vermoeseni* (DeWild.) Keay & Brenan
- 74 [225] *Albizia aylmeri* Hutch.
- A. malacophylla* (Steud. ex A.Rich) Walp. var. *malacophylla*
- [226] *A. malacophylla* (Steud. ex A.Rich) Walp. var. *ugandensis* Bak.f.
- 75 [227] *Albizia zygia* (DC.) Macbr.
- 76 [242] *Argyrolobium arabicum* (Decn.) Jaub. & Spach
- 77 [243] *Astragalus atropilosulus* (Hochst.) Bunge subsp. *abyssinicus* (Hochst.) Gillett var. *abyssinicus*
- 78 [244] *Biserrula pelecinus* L. subsp. *leiocarpa* (A.Rich.) Gillett
- Biserrula pelecinus* L. subsp. *pelecinus*
- 79 [268] *Erythrina sigmoidea* Hua
- 80 [272] *Indigofera costata* Guill. & Perr. subsp. *costata*
- 81 [274] *Indigofera longicalyx* Gillett
- 82 [283] *Lonchocarpus laxiflorus* Guill. & Perr.
- 83 [284] *Lotononis platycarpus* (Viv.) Pic.-Serm.
- 84 [288] *Pterocarpus lucens* Lepr. ex Guill. & Perr.
- 85 [298] *Vermiflux abyssinica* (A.Rich.) Gillett
- 86 [305] *Celtis integrifolia* Lam.
- 87 [306] *Trema orientalis* (L.) Bl.
- 88 [313] *Ficus palmata* Forsk.
- 89 [316] *Ficus sur* Forsk.

Map

- 90 [321] *Parietaria debilis* Forst.f.
91 [336] *Cyphostemma crinita* (Planch.)Descoings
92 [339] *Cyphostemma sesquipedalis* (Gilg)Descoings
93 [347] *Khaya senegalensis* (Desr.)A.Juss.
94 [348] *Pseudocedrela kotschy* (Schweinf.)Harms
95 [359] *Rhus vulgaris* Meikle
96 [361] *Cussonia arborea* Hochst. ex A.Rich.
97 [362] *Polyscias fulva* (Hiern)Harms
98 [364] *Berula erecta* (Huds.)Coville
99 [365] *Caucalis melanantha* (Hochst.) Hiern
100 [368] *Diplophium africanum* Turcz.
101 [369] *Ferula communis* L.
102 [371] *Hydrocotyle ranunculoides* L.f.
103 [372] *Steganotaenia araliacea* Hochst.
104 [373] *Torilis arvensis* (Huds.)Link
105 [374] *Blaeria spicata* Hochst. ex A.Rich. subsp. *spicata*
106 [381] *Olea laperrinei* Batt. & Trab.
107 [385] *Calotropis procera* (Ait.)Ait.f.
108 [386] *Caralluma* sp. aff. *vittata* N.E.Br.
109 [389] *Gomphocarpus fruticosa* (L.)Ait.f.
110 [396] *Anthospermum pachyrrhizum* Hiern
111 [402] *Galium thunbergianum* Eckl. & Zeyh.
112 [409] *Mitragyna inermis* (Willd.)Kuntze
113 [410] *Mussaenda arcuata* Lam. ex Poir.
114 [412] *Oldenlandia echinulosa* K.Schum.
115 [427] *Bidens chaetondonta* Sherff
116 [429] *Bidens prestinaria* (Sch.Bip.)Cuf.
117 [432] *Centaurea senegalensis* DC.
118 [436] *Conyza pyrrhopappa* Sch.Bip. ex A.Rich. subsp. *pyrrhopappa*
119 [437] *Conyza schimper* Sch. Bip. ex A.Rich. subsp. *schimper*
120 [441] *Crepis rueppellii* Sch. Bip.
121 [444] *Echinops boranensis* Lanza
122 [445] *Echinops longifolius* A.Rich.
123 [446] *Echinops macrochaetus* Fresen.
124 [449] *Felicia dentata* (A.Rich.)Dandy subsp. *dentata*
[449] *Felicia dentata* (A.Rich.)Dandy subsp. *nubica* Grau
125 [454] *Gnaphalium undulatum* L.
126 [455] *Gnaphalium schultzei* Mendonça
127 [461] *Laggera braunii* Vatke
128 [465] *Melanthera pungens* Oliv. & Hiern
129 [466] *Osteospermum vaillantii* (Decn.)Norlindh
130 [468] *Phagnalon scalarum* Schweinf. ex Schwartz var. *scalarum*
[469] *Phagnalon scalarum* Schweinf. ex Schwartz var. *meridionale* (Quézel)Wickens
131 [472] *Pulicaria crispa* (Forsk.)Oliv.
132 [474] *Pulicaria undulata* (L.)C.A.Mey.
133 [475] *Reichardia tingitana* (L.)Roth
134 [478] *Senecio hochstetteri* Sch.Bip. ex A.Rich.
135 [479] *Senecio tuberosus* Sch. Bip. ex A.Rich.
136 [492] *Vernonia richardiana* (Kuntze) Pic.-Serm.
137 [496] *Swertia abyssinica* Hochst.
138 [498] *Asterolinon adoensis* Kuntze
A. linum-stellatum (L.)Duby

Map

- 139 [500] *Campanula edulis* Forsk.
140 [502] *Arnebia hispidissima* (Sieber ex Lehm.)DC.
141 [509] *Myosotis abyssinica* Boiss. & Reut.
142 [535] *Ipomoea verbascoidea* Choisy
143 [539] *Alectra sessiliflora* (Vahl)Kuntze var. *senegalensis* (Benth.)Hepper
144 [540] *Bellardia trixago* (L.)All.
145 [542] *Celsia sudanica* (Murbeck)Wickens
C. pedunculosa Steud. & Hochst. ex Benth.
146 [543] *Craterostigma plantagineum* Hochst.
147 [550] *Misopates orontium* (L.)Raf.
148 [551] *Parentucellia latifolia* (L.)Caruel
149 [554] *Scrophularia arguta* Sol.
150 [560] *Verbascum sinaiticum* Benth.
151 [589] *Lippia multiflora* Moldenke
152 [591] *Vitex doniana* Sweet
153 [598] *Lavandula pubescens* Decne.
154 [601] *Mentha longifolia* (L.)Hudson
155 [602] *Nepeta ballotifolia* Hochst. ex A.Rich.
156 [605] *Otostegia fruticosa* (Forsk.)Briq. subsp. *fruticosa*
Otostegia fruticosa (Forsk.)Briq. subsp. *schimper* (Benth.)Sebald
157 [608] *Satureja punctata* (Benth.)Briq.
158 [624] *Cyanotis barbata* D.Don
159 [630] *Aloe elegans* Tod.
160 [636] *Chlorophytum geophilum* Peter ex Poelln.
161 [640] *Drimiopsis barteri* Baker
162 [659] *Lapeirousia schimper* (Aschers. & Klatt) Milne-Redh.
163 [660] *Romulea camerooniana* Baker
164 [663] *Sansevieria liberica* Gér. & Labr.
165 [668] *Hypoxis angustifolia* Lam.
166 [670] *Ansellia gigantea* Reichenb.f. var. *nilotica* (Baker)N.E.Brown
167 [671] *Disperis anthoceros* Reichenb.f. var. *anthoceros*
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169 [673] *Habenaria bongensium* Reichenb.f.
170 [674] *Habenaria cirrhata* (Lindl.)Reichenb.f.
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172 [676] *Habenaria humilior* Reichenb.f.
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178 [707] *Kyllinga chlorotropis* Steud.
179 [721] *Pyreus mundtii* (Nees)Kunth
180 [728] *Agrostis lachnantha* Nees
181 [729] *Aira caryophylla* L.
182 [731] *Andropogon distachyos* L.
183 [735] *Andropogon longipes* Hackel
184 [742] *Aristida caerulea* Desf.
185 [764] *Brachypodium sylvaticum* (Hudson)P.Beauv.
186 [765] *Bromus leptoclados* Nees
187 [766] *Bromus pectinatus* Thunb.
188 [767] *Calamagrostis epigejos* (L.)Roth var. *capensis* Stapf

Map

- 189 [825] *Festuca abyssinica* A.Rich. var. *abyssinica*
190 [826] *Gastridium phleoides* (Nees & Meyen)
C. E. Hubbard
191 [829] *Helictotrichon elongatum* (Hochst. ex A.Rich.)
C.E.Hubbard
192 [844] *Hyparrhenia multiplex* (Hochst. ex A.Rich.)
Anderss. ex Stapf
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194 [861] *Melinis tenuinervis* Stapf
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196 [879] *Pennisetum glabrum* Steud.
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201 [890] *Poa leptoclada* Hochst. ex A.Rich.
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Stapf & Hubbard
203 [902] *Schoenefeldia gracilis* Kunth
204 [907] *Setaria lynesii* Stapf & Hubbard
205 [912] *Snowdenia polystachya* (Fresen.)Pilger
S. *mutica* (Hochst. ex Fresen.) Pilger
S. *petitiana* (A.Rich.)C.E.Hubbard
S. *microcarpa* C.E.Hubbard
206 [928] *Tripogon leptophyllus* (A.Rich.)Cuf.
207 [930] *Tripogon montanus* Chiov.
208 [932] *Vulpia bromoides* (L.)S.F.Gray

*C'est dans les monographies
que tous les hommes qui s'occupent
d'idées et de travaux généraux,
vont puiser les matériaux de leurs
méditations et de leurs ouvrages.*

A.P. de Candolle, Théor. Élémt. Bot. :266 (1813)

Abstract

Jebel Marra is an isolated volcanic massif in the Sudan Republic near the border with Chad. It is 1600 km from the sea, i.e., in the very heart of the African continent. In view of its isolated position, the origins of its flora are of considerable phytogeographical interest.

This present study includes not only the vegetation of the massif but also part of the lowland plain, and is the area surveyed by the writer for the United Nations Development Program, Jebel Marra Project during 1964 and part of 1965.

The description of the area includes an outline of the history of Darfur as well as the history of the botanical exploration of Jebel Marra, which began with the collections of Admiral Lynes in 1920. The geology, geomorphology, soils and climate are briefly described, also the vegetation of the lowlands and massif, the vegetation of the latter in greater detail.

In the chapters dealing with the phytogeography it was found necessary to revise slightly the boundaries of the phytogeographical divisions of Africa, as well as to describe, and in some cases, define, these divisions. A brief outline of the geomorphic history of Africa is given, with special emphasis on the Quaternary period. A hypothetical reconstruction of the vegetation for the Sudan during a 'pluvial' has also been prepared.

The lake, Mega-Chad, is believed to have acted as a barrier preventing the free east-west migration of

plants. The stronger affinities of the lowland flora with East rather than West Africa can be attributed to such a barrier. It was also observed that the southern boundary of the Sahelian Domain more or less coincided with the southernmost extent of the Pleistocene sand invasions.

The montane and temperate elements have been analyzed by means of a computer to produce a dendrogram showing the Ethiopian, East African Highland, Boreal and Saharo-montane elements. Four maps have been produced, one for each element, illustrating the concentration of the constituent taxa by means of contour lines termed 'isochores'. The migration routes postulated for each element have been prepared. The Boreal element is presumed to have reached Jebel Marra via the Red Sea Hills and Ethiopia and not by way of the Saharan mountains. If the latter route had been used, then the evidence for it has now been almost completely destroyed.

The check-list provides all the references and synonymy believed to be relevant to a flora for the Sudan. Details of all the specimens seen are also given. Distribution maps have been prepared for over 200 taxa.

This work partially fulfilled the requirements for the degree of Doctor of Philosophy at the University of Reading.

Chapter 1

Geographic location

The area surveyed lies within that part of Africa which is more than 1600 km from the sea (Fig. 1). It is almost in the centre of the African continent, being equidistant from the Atlantic and Indian Oceans, the Mediterranean and the Red Sea. Covering approximately 30,750 sq km (12,000 sq miles), its boundaries are defined as follows: 'Between longitudes 22°30'E and 23°30'E, the northern boundary is the parallel of latitude 13°00'N, and between 23°30'E and 24°45'E in latitude 13°30'N; between longitudes 22°30'E and 24°00'E the southern boundary is the parallel 12°00'N and between longitudes 24°00'E and 24°45'E in latitude 12°30'N.' Because they enclosed an area believed to be most suitable for the development of irrigation, these limits were decided in 1957 for the Phase 1 Studies by Hunting Technical Services Ltd. The favourable

Fig. 1 Sketch map of Africa showing area more than 1600 km from the sea.



conclusions obtained during this preliminary survey led to the acceptance of the same boundaries for more intensive surveys by the United Nations Special Fund Jebel Marra Project from 1963 to 1967 (from 1966 the United Nations Special Fund became known as the United Nations Development Program).

Lying wholly within Darfur Province of the Republic of the Sudan, the major part lies within the Western District, for which the administrative centre (and project headquarters) is Zalingei, a small township of approximately 8000 inhabitants. There are minor extensions of the area into the Southern and El Fasher Districts.

The capital and administrative centre for the province is at El Fasher, approximately 220 km to the north-east of Zalingei. The nearest railhead is at Nyala, some 200 km to the south-east of Zalingei. The third important town in the province is El Geneina, 140 km to the north-west of Zalingei. All three towns are served by regular flights of Sudan Airways; the airstrip at Zalingei can be used by Dakota and Fokker Friendship aircraft, so far only by charter flights.

Road conditions within the survey area are difficult. During 1964 the roads were impassable to wheeled vehicles for nearly six weeks during the rainy season. Conditions have since been improved by the construction of hard crossings for many of the major wadis (rivers) and khors (streams). The Forests Department have recently constructed on the Jebel Marra massif a motor track from near Jebel Teringa through Gubbo and Gur Lambang to Tora Tonga. Other motorable tracks on the massif are to Saur, Beldong, Koronga and Suni. The old road to El Fasher from Turra across to Tarni is only motorable by 4-wheel drive vehicles in an east to west direction, because it is impossible to climb some of the slopes from the opposite direction. Access to the massif is otherwise on foot with donkey transport.

Chapter 2

History of Darfur

Man and his grazing animals can have a drastic effect on an environment, hence it is important that historical evidence should be considered in relation to plant distribution. The human interest in Jebel Marra stems from the fact that here adequate quantities of potable water are available, half way between the east and west coasts of Africa; it is therefore a natural focal point for trans-African migrations by man. Balfour-Paul (1955) has recorded evidence of palaeolithic man being firmly established in the Wadi Howar area to the north of the Jebel Marra massif; recently H. H. J. Lambert (1967, private communication) discovered what appears to be a late palaeolithic flake and chopper industry on the southern flanks of the massif between Nyertete and Kalokitting. Neolithic man was certainly well established both in the Wadi Howar area as well as immediately to the north of the massif. Arkell (1961) is of the opinion that early man was able to travel in an east to west direction across what is today virtually uninhabitable desert or semidesert. His suggested route follows the direction of the great water-course of the Wadi Howar from the Nile to Ennedi, the western Bahr el Ghazal across to Lake Chad, and the Wadi Tafessasset, which rises on the eastern slopes of the Ahaggar mountains and flows in a south-easterly direction into Lake Chad. From the Ahaggar mountains the Wadi Azaouak leads to the Niger River. The characteristic necked axe-heads found in the Wadi Howar area, with occasional specimens from the Sahara and West Africa are regarded as lending support to Arkell's trans-Saharan route. Many of the rock paintings and drawings found in the Wadi Howar area can reasonably be attributed to neolithic man. Some of the painted caves in the Tagabo Hills may even be by palaeolithic man (Balfour-Paul, 1955). The fauna featured in these paintings are no longer to be found in the area; but this must not necessarily be regarded as positive evidence of climatic changes, because indiscriminate hunting by man has forced game to retreat further south, away from their former grazing areas. Today elephant, lion and giraffe can still be observed in the Jebel Marra foothills. Even a hundred years ago both lion and hyena were known in Kordofan as far north as 14°N (Wickens, 1970), where now there is scarcely any game of any description to be seen north of 12°N (see Wickens, 1975b for further discussion).

It is becoming increasingly difficult to assemble the oral traditions of the history of Darfur. Now that the Fur have nominally embraced Islam, they prefer not to remember their earlier beginnings, for it is 'unclean'.

A Dr R. W. Felkin (1885) records having seen some arabic documents during his visit to Darfur in 1879 purporting to contain some historical data; these documents were believed to have been destroyed during the Mahdist era, although there are still a few authentic historical writings to be found in Darfur (O'Fahey & Ahmad, 1973), nevertheless it is necessary to rely mainly on oral tradition.

Three dynasties, the Daju, Tunjur and Keira/Fur, are known to have emerged from the original neolithic Tora population; traditionally all three arose from inter-marriage and absorption of the immigrants without bloodshed. All three appear to have adopted the ancient Tora skills in dry-stone walling and bench terracing. The uniformity of the construction of the walls is such that it is impossible to ascribe with any certainty a particular dry-stone construction to a particular dynasty. By tradition those buildings to the south and east of the Jebel Marra massif belong to the Daju, various others to the north and north-west belong to the Tunjur, while those found in the Turra Hills are attributed to the early Keira kings (Balfour-Paul, 1955).

All the accessible slopes are terraced (Plates 1 & 7). Abandoned bench terraces have been observed as high as 2750 m, although today cultivation rarely occurs above 2600 m. There is a seasonal movement of the



Plate 1 Terraced hill slopes above Suni at 2700 m.

people from their winter quarters near the perennial streams, where they produce their irrigated crops, to the terraced hill slopes where they grow their rain-fed crops. Some of these rainy season farms may be at a considerable distance from their winter quarters. This movement is probably a very ancient custom. In times of sickness entire villages may be wiped out or abandoned, hence it is difficult to decide whether the extent of their terracing can be interpreted as evidence of a larger population occupying the massif in the past; in my opinion it probably was larger. A careful archaeological survey would help to clarify the situation, as a shifting population could have a similar effect to that of a larger settled population (Wickens, 1966 & 1971).

By AD 1200 the Daju were the rulers of Darfur, to be replaced in the northern and central areas by the Tunjur in AD 1350. The Tunjur are believed to have originally come from the Dongola area. The southern part of Darfur still remained under the control of the Daju. During this period there was an infiltration of nomadic Arabs from the north and east, some of whom settled in Darfur, others moved further west. Although they never conquered Darfur, they spread Islamic customs and beliefs so that by AD 1500 Islam was the official religion, with Arabic spoken at the court. Shortly afterwards Darfur became part of the great Bornu empire, which extended from Northern Nigeria to the Nile. The Bornu empire is known to have collapsed in 1603. The Keira/Fur dynasty succeeded that of the Tunjur at about the same time.

Later the Fur were driven back from the Nile, and by 1770 they had also lost Kordofan, and although soon regained, Kordofan was finally lost in 1822. Darfur was annexed by Egypt in 1874 and overrun by the Mahdists in 1882. Resistance to the Khalifa's authority continued from the Jebel Marra massif, to the safety of which many of the lowland Fur from the nearby piedmont plains had fled. It is only in recent years that the western piedmont plains have again begun to be repopulated. After the battle of Omdurman in 1898, Ali Dinar seized the throne of Darfur and maintained an independent sultanate there, while still owing allegiance to the Anglo-Egyptian Sudan. Ali Dinar revoked his allegiance in 1916, taking sides with Turkey and becoming involved with the Senussi uprisings in French territory. After a short campaign his army was totally defeated by an Anglo-Egyptian force; while in retreat he was killed at Kulme by a chance bullet. Darfur was then brought into the Anglo-Egyptian Sudan and governed by officials appointed from Khartoum.

Man's influence on the area may be summarized as follows:

- 1 An occupation of the massif by man for at least 2000 years, during which time the vegetation must have drastically altered. It is probably only the more inaccessible gallery forests that have not been affected by fire, man or his grazing animals.
- 2 A migration by early man from the east to the west.
- 3 Close contact with West Africa and Ethiopia during

the height of the Bornu Empire. Contact with West Africa is still maintained by Moslem pilgrims en route to Mecca and by cattle traders trekking cattle from Nigeria for sale in Khartoum.

- 4 Trade between central Africa and Egypt was centred on Kobbe, a great trade centre and the southern terminus of the Derb el Arba'in, the 'Forty Day' road to Asyut on the Nile. Kobbe ceased to be the capital of Darfur when its water supply failed and El Fasher was adopted as the capital during the 17th century. Schweinfurth (1873) has a map of his journeys which shows a slave trade route from southern Sudan to Darfur.

- 5 European influence in Darfur is limited to a brief period from 1874 to 1882 and from 1916 onwards. It is highly probable that during the first period members of the Egyptian Military Expedition (see Wickens, 1970, for further details) and government officials such as Slatin introduced vegetable seeds for their own consumption – Schweinfurth certainly grew vegetables at his base camp near Tonj in Bahr el Ghazal Province. It is believed that tomatoes were introduced into Darfur during this period (Lampen, 1950). Since Egypt never managed to gain control over the Fur on the Jebel Marra massif and never had access to the massif, it is unlikely that there was any direct introduction of 'foreign' seed onto the massif during this period. The Lynes collection during 1920–21 is therefore especially interesting for it represents a flora uncontaminated by European influence. In recent years foresters and horticulturalists have, no doubt unwittingly, introduced new species which have either arrived as contaminants or escaped from cultivation, e.g. *Rubus niveus* Thunb.

One of the interesting crops grown by the Fur on Jebel Marra is wheat. The source of the original introduction is not known, although F. G. H. Lupton (personal communication, 1964), who examined a sample of *Triticum durum* Desf. from the Jebel, suggested that originally it could have come from either Ethiopia or from the Lake Chad area. The historical links of Darfur with the Bornu Empire would indicate Chad as being the likely source of the introduction. The explorer Dr Barth, writing from Bornu states 'Wheat, on the contrary, was evidently introduced some hundred years ago, together with onions, the favourite food of the Arab . . .' (Kirk-Green, 1962). This would place the introduction of wheat into West Africa somewhere in the 1750's, a hundred and fifty years after the collapse of the Bornu Empire.

Local tradition names Sultan Teirab (1752–58) as introducing wheat from the Fung, who could have obtained seed from Ethiopia or even from Egypt. It is interesting to note that this coincides with the suggested date of introduction into West Africa. A trading caravan from Ethiopia to Nigeria via Jebel Marra is just as probable as Sultan Teirab bringing back wheat as booty after his wars with the Fung. Apart from a few trading posts along the Sudan–Ethiopian border,

Ethiopia has remained peculiarly isolated from the rest of Africa, although there seems to be some evidence of a desultory trade through Sennar, or just south of it, westwards to Kordofan and Darfur and thence to West Africa from *c.* 1400. Crawford (1958) published a map showing such a trade route from Gondar to Sennar, El Ais, El Obeid, El Fasher, Kobbe, Wadai and Lake Chad.⁽¹⁾ Moslem pilgrims also followed this route.

Wheat was evidently an established crop by 1793 when the traveller W. G. Browne (1806) visited Darfur

and reported wheat being grown on the massif. Felkin (1885) writes 'Wheat is grown to a limited extent in the Jebel Marra district, but, curiously enough, it is never eaten, but exported as an article of barter'. This is still the practice today.

It is unfortunate that the original source of the wheat grown on Jebel Marra is shrouded in such mystery. Its introduction must have brought seeds of other plants as contaminants; such plants would lose some of their phytogeographical interest once it was established that they had been introduced by man.

(1) I am grateful to Sir Laurence Kirwan for this information.

Chapter 3

The history of the botanical exploration of Jebel Marra

The flora of Darfur, let alone Jebel Marra, was virtually unknown until fifty years ago. The explanation of this apparent lack of interest is threefold.

Firstly, the difficulty of access. Darfur is at least 1600 km from the sea, in any direction (Fig. 1) and travellers to Darfur must of necessity travel through monotonous arid or semi-arid terrain with a relatively uninteresting flora in order to reach the area. A journey of similar length elsewhere in Africa is likely to be far more botanically rewarding en route.

Secondly, the early travellers received a very unfriendly reception. Browne, the first European to reach Darfur in 1793 was virtually a prisoner at El Fasher for three years before being permitted to leave (Browne, 1806). Even when the sultanate of Darfur was annexed by Egypt in 1874, Jebel Marra remained unapproachable for it was the stronghold of Fur tribesmen who were still hostile to the new regime. Even if Dr Pfund, the first botanist to visit Darfur, had lived, he would still have been unable to visit the massif (Wickens, 1970). Shortly before the Mahdist uprising Rudolph Slatin, then Governor-General of Darfur, led a punitive force over the massif in a surprise attack against some rebel Fur (Slatin, 1896). He is believed to be the first European to actually visit the massif. The Mahdist period from 1882 until 1898 certainly made it impossible for any foreigner to reach Darfur. Afterwards, when Sultan Ali Dinar became the ruler of Darfur, the frontiers still remained closed to all outsiders until 1916, when Darfur was brought into the then Anglo-Egyptian Sudan. It was not until 1918 that the first Europeans ascended the peaks around the Deriba Crater (Hobbs, 1918).

The third factor was a misconceived idea about the Jebel Marra massif; it was believed to be no more than 1830 m high. The error appears to have arisen during the survey by the Egyptian Military Expedition of 1875–76 (where Dr Pfund was employed as the expedition's botanist). A topographic map produced by the expedition (Mason, 1880) gives an altitude 1830 m for the massif. It seems improbable that this was intended to indicate the highest point, especially when the surrounding countryside appears to have been surveyed reasonably accurately and the massif so obviously rises far above the plain. However, the error was perpetuated in all the later maps of Africa. It was not until the great Sahara explorer and surveyor, Commandant Tilho, returning to France via the Sudan in 1917, checked the height, that it was realized that the highest point was in the region of 3000 m

(Tilho, 1918).

The first collections of plants from the Jebel Marra massif were made by the ornithologist, Admiral (then Captain) Hubert Lynes in 1920 and again in 1921. Although of considerable interest, these collections failed to stimulate further expeditions to the area. These collections are also important because they help to give some idea of what plants were present before there was any direct European influence in the province.

Visiting and local government officials, sometimes accompanied by their wives, and usually while spending a brief leave on the massif, have made a number of small collections. These collections, made during the dry season, are generally not of very great interest and are usually lacking in adequate field notes. Apart from Admiral Lynes, the more interesting and comprehensive collections are those of Mr J. E. Dandy of the British Museum (Natural History), Mr J. K. Jackson, a forester, formerly of the Sudan Government, later with FAO and Mr I. J. Blair, an FAO pasture expert who accompanied the writer on several field trips to the massif.

Short notes on all the collectors known to the writer are given in Appendix A, together with their itineraries if known. Co-ordinates of known collecting localities are given in Appendix B.

The possibilities for developing the area agriculturally were first examined for the Sudan Government by Hunting Technical Services in 1957. During the three month survey the geology, forestry potential and irrigation possibilities were examined (Hunting Technical Services, 1958). A favourable report led to the United Nations Special Fund Jebel Marra Project from 1963 to 1967. This was a fully integrated, multi-disciplined survey in which the writer participated as the leader of a small team from Hunting Technical Services responsible for the soil, vegetation and present land use surveys. A large and comprehensive collection of plants was made during the course of these surveys and is housed in the Herbarium, Royal Botanic Gardens, Kew.

In 1967 a French expedition led by Professor Quézel was unable to visit Jebel Marra but explored Jebel Gurgeil, a northern outlier. This hitherto botanically unexplored volcanic peak has a surprising number of species previously only recorded in the Sudan from Jebel Marra, including *Olea laperrinei*. The results of this expedition (Quézel, 1968, 1969 & 1970) should be considered in relation to this present study.

Chapter 4

Geology and geomorphology

Jebel Marra is a dormant, late Tertiary, volcanic massif resting on a base of Archaean rocks at the summit of an upwarping between the Chad and Nile basins, i.e. it straddles the Nile and Chad watershed (Fig. 2).

The Archaean rocks, better known in the Sudan as the Basement Complex, include all the igneous and sedimentary rocks, whether metamorphic or not, forming an erosion surface on which the quasi-horizontal continental sediments rest (Andrew, 1948). The lowlands of the Basement Complex have been formed from the more easily weathered schists and gneisses, while the hill lands such as the Tebella Massif (1413 m) and the Kongyo Hills (1359 m), lying to the south-east and north of Zalingei respectively, are from the more resistant parashists and gneiss, and represent the remnants of a higher and older land surface. It is believed that the volcanic massif rests on a Basement Complex pedestal which conforms to this older land surface (Hunting Technical Services, 1958).

About 150 km to the east of the Jebel Marra massif the Basement Complex becomes covered by Nubian Sandstone; these sandstones are post-Carboniferous and 'in all probability Mesozoic, and might be Cretaceous' (Sandford, 1935). There is some evidence that the Nubian Sandstone extended further to the west, outliers having been recorded near El Geneina and El Fasher (Lebon & Robertson, 1961); and in the area under consideration, near Garsila, to the south-west of the massif, also in the eastern foothills, on the road between Melemm and Suni. The latter site is intruded by and capped with basalt.

The volcanic massif is a lofty and rugged range rising to over 3000 m; roughly pear-shaped in area, some 90 km long by its north-south axis, with a maximum of 65 km along the southern part of its east-west axis. The massif is continued northwards for a further 95 km as a number of smaller uplands and subsidiary vents. To the north-east are the Berti or Tagabo Hills and the Meidob Hills; the former is partly, the latter wholly, of volcanic origin. To the north lies Jebel Gurgeil, also of volcanic origin.

On the south and south western flanks of the volcanic massif are the remnants of a once far more extensive ash piedmont that rise to an elevation of 1150 m. The other flanks are fringed by rather broken country formed by Basement Complex hills (Fig. 3). The land rises fairly gently at first, then steeply, to the high plateau lying between 2300 and 2600 m. This is a gently rolling plateau of ash and tuff soils. The main crater of Deriba lies in the south-west corner of this

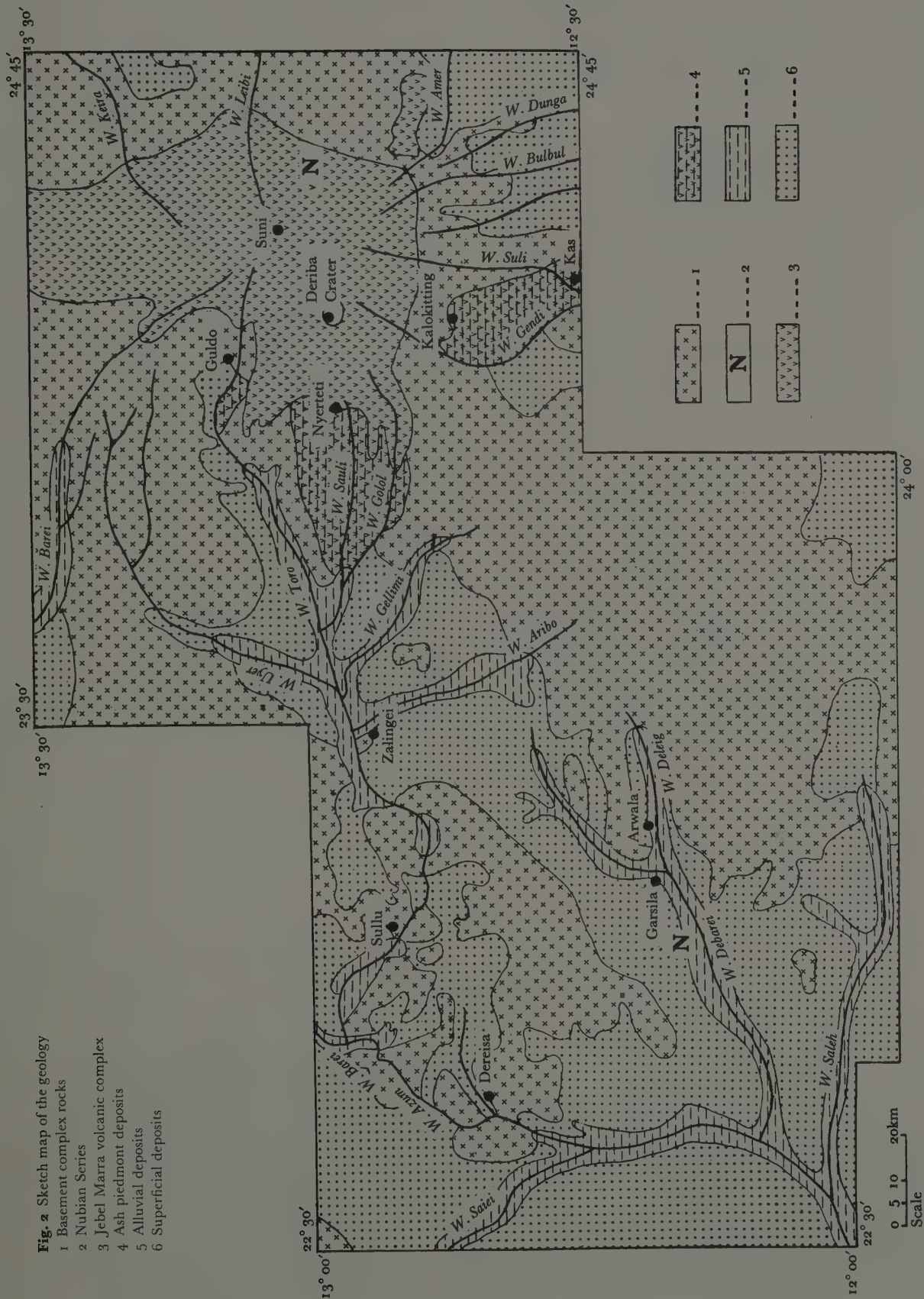
plateau. The floor of the crater, which also contains a subsidiary crater, is at 2300 m, while the serrated rim of the main crater rises to over 3000 m. Other lava peaks lie to the north and east of Deriba, of which, Jebel Uwo at 3042 m is probably the highest. Towards the north the ash plateau gives way to broken country formed by the dissection of ancient, flat-topped lava flows, and eventually passes into Basement Complex hills.

Volcanic activity is believed to have started in the Upper Tertiary (Miocene) times (Andrew, 1948). The present caldera of Deriba is the last of a series of craters. The first eruptions probably started further to the north and have worked their way south. One of these older craters can be seen near Gur Lambang and must have erupted violently, bursting its western rim to form the gap through which the Wadi Bulbul now flows from springs in the crater floor. Later ash deposits from the Deriba Crater have now buried all but the eastern flanks of this earlier crater.

Three phases of volcanic activity were recognized during the 1957-58 geological investigation (Hunting Technical Services, 1958). The first phase resulted in the accumulation of a great thickness of basalt and trachyte lavas and tuff to form the main mass of the massif. As the earlier flows were more basic and extremely fluid, they flowed for long distances from their source down existing drainage channels before coming to rest and solidifying. The later flows became progressively more acid in composition and consequently less fluid, solidifying closer to their source and building up the lava mountain which forms the base of the present volcano.

A period of relative quiescence followed during which the newly formed mountain was subjected to very intense sub-aerial erosion, resulting in the formation of the extensive current-bedded piedmont alluvial and colluvial deposits to the south and west of the massif; the prevailing down-wind direction being to the south-west. The piedmont plain has clearly been more extensive in the past, traces being found as far away as Baraka, over 150 km to the west, as well as at Zalingei. As the effect of volcanic activity was to raise the watershed of the region, a higher precipitation probably ensued, and a new drainage system had to be established. A small but significant sinking of the landsurface also took place.

During a second eruptive phase relatively small quantities of basaltic lavas, from subsidiary vents on the flanks of the main volcano, were intercalated in or



overlie the piedmont deposits. These flows followed the newly formed drainage channels so that in some cases they are found in the valley bottoms while the older flows cap the valley sides at a considerably higher elevation.

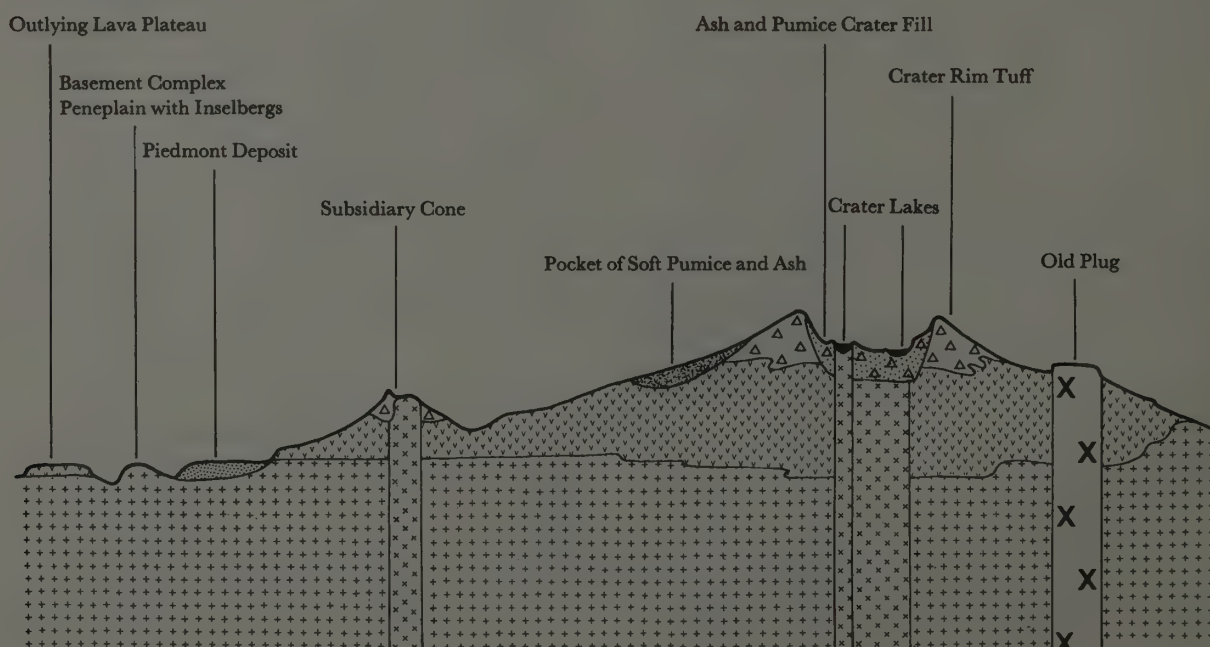
The present day Deriba Crater is a well-developed caldera, 5 km in diameter, with a subsidiary central cone containing a deep (100 m) saline lake. A larger, shallower (12 m) and more saline lake overlies part of the eastern floor of the caldera (Hammerton, 1966). Caldera volcanoes are prone to very violent and destructive eruptions, during which the contents of their lakes are forced over or through the crater rim. An eruption of this kind has clearly taken place at Deriba, leaving a gap in the south-east rim of the crater and a thick deposit of ash and pumice on that side of the mountain. A similar deposit on the north-west slopes of the main cone probably dates from an earlier eruption, the crater rim in that quarter having re-formed. The last discharge from the lake, of which the larger of the present-day lakes is a remnant, appears to have taken place at the same time as the formation of the subsidiary cone within the main crater. A sample of carbonized wood obtained from a gully to the north of Deriba Crater wall has provided a ^{14}C date of 3520 ± 100 BP (Francis *et al.*, 1973). This is probably related to the final eruption of the caldera. The carbonized wood has been identified at the Jodrell Laboratory, Kew as *Olea* sp. This is presumably *O. laperrinei* Batt. & Trab., but there is no material with which to make the necessary anatomical comparisons (Wickens, 1975a). The thick tuffs deposited during the eruptions of the Deriba Crater have now developed spectacular badland topography. There are thick ash and pumice deposits forming high altitude plains at Tora Tonga

and Tereng, which probably originated from the subsidiary cone in the Deriba Crater and from small cones along the flanks of the massif. On the western piedmont it is possible to plot a pumice band in the ash soil centering on a small cone to the south of Mortagello; some ash eruptions may have continued into recent, possibly historical times (White, 1966). The fresh appearance of the Deriba crater rim is certainly suggestive of volcanicity continuing into the Pleistocene (Andrew, 1948).

Warm springs were recorded on Jebel Idwa, a subsidiary cone 2 km to the north of Deriba (Hunting Technical Services, 1958), also hot springs and fumaroles along the north-west margin of the inner Deriba crater lake (Hammerton, 1966 & 1968). These are probably the springs referred to by Miss Steele in her letter dated 25th January, 1937 and attached to her herbarium specimen of *Polypogon monspeliensis* (L.) Desf. (Steele 38), where she refers to hot springs inside the crater and also near Koronga (Kronga). The 1:250,000 Nyala map sheet also shows a hot spring at Hami, almost 75 km due south of Deriba. The evidence points to Jebel Marra as being a dormant rather than an extinct volcano, as was previously believed (Burton & Wickens, 1966), the fumaroles being possibly the final manifestations of much earlier volcanic activity (Hammerton, 1968).

The geological and geomorphic sequences of events are as follows (White, 1966; Lambert, 1968): deposition of the continental Nubian sandstone formation in the basins of the Basement Complex during the Cretaceous, followed by regional uplift to form the Nile-Chad divide and the almost complete erosion of the Nubian in the area during the Mesozoic. The initial major eruption of the Jebel Marra volcanic complex occurred

Fig. 3 Diagrammatic east-west geological section across the Jebel Marra massif.



during the mid-Tertiary, causing local uplift and build-up of the massif. During the Mio-Pliocene there took place peneplanation and shallow basin formation in the surrounding area, with dissection of the volcanic massif and deposition of the piedmont.

Regional uplift and the second major lava eruption, together with the formation of the Deriba Crater, occurred during the Plio-Pleistocene. This uplift resulted in the formation of the Umm Ruwaba series of Kordofan. Further build-up of piedmont deposits followed the initial dissection and channel fills at Kalokitting etc. The main wadi courses were deeply incised, then filled following local (?) down-warp.

Regrading of the peneplain and the formation of the grey clay plains took place during a pluvial period in the Pleistocene. Planation of the piedmont and the formation of the upper alluvial terrace of the main wadis also took place, with contemporaneous ash eruptions from subsidiary craters and possibly a small lava eruption to the west of Golol.

Also during the Pleistocene there was further regional uplift and the onset of a period of desiccation, with sand invasions from the north-east forming an undulating sand sheet that penetrated to the north-eastern foot of the Jebel Marra massif, also forming trailing dunes on the lee side of some of the inselbergs on the north-western peneplain near Murnei. The initial dissection of the clay plains and the piedmont, and the formation of the red-brown drift mantle also took place during this period, as well as the dissection and reconstitution of the upper wadi terraces.

Further uplift occurred during recent times, with further dissection of all the previously mentioned formations. The major beds of the wadis were established and there were ash eruptions from subsidiary craters.

A number of leaf impressions were obtained from a

small exposure in the ash piedmont to the north of Nyama (Wickens, 1975a). These are mainly of the oil palm, *Elaeis guineensis* Jacq., but also include *Combretum molle* R.Br. ex G.Don, *Saba florida* (Benth.) Bullock, *Lippia* sp. and *Oxytenanthera abyssinica* (A.Rich.) Munro. All of which, apart from *Elaeis* are to be found in the area today. The age of the impressions is tentatively placed at post 10 000 BP but pre 3500 BP⁽¹⁾.

The main drainage from the massif is to the west and south. Many of the streams on the western slopes of Jebel Marra are truly perennial for up to 20 km from their sources, as are also a few that flow to the east. Beyond these limits surface flow only occurs during the rainy season, which lasts from May to September. The westward flowing streams unite to form the Wadi Azum, by far the most important river, to reach Lake Chad. Those that flow to the south eventually join the Bahr el Arab, while those to the east enter the Wadi el Ku, whose eastward progress has been diverted southwards by the invading sand sheet, and finally ceases to flow (Lebon & Robertson, 1961).

The area is geologically extremely interesting because the Jebel Marra massif is strategically sited at the intersection of two volcanic-tectonic zones (Vail, 1972a, b). The ENE. alignment of volcanic rocks and fracture zones extends from Mt Cameroon and across the Sudan via Jebel Marra, Tagabo Hills, Meidob Hills, Wadi el Milk basalts, Bayuda volcanics and into the Red Sea Hills. The other line of fracture and volcanic activity runs SSE. from northern Libya through to the north of Tibesti, Jebel Marra and into East Africa near Mt Elgon. Its relation to the Rift Valley tectonics is not yet clear, but what is certain is that Jebel Marra holds the key to our understanding of much of the recent volcanic activity in the continent (Vail, 1972a).

(1) Recent geomorphic studies now suggest that these fossils are probably Middle Pleistocene, not Holocene (M. A. J. Williams 1976, personal communication).

Chapter 5

Soils

A sketch map of the distribution of the principal soil types is shown in Fig. 4. Three geomorphic soil units are recognized by White (1966) for the area. These are: (1) Basement Complex. (2) Aeolian Sands. (3) Volcanic Mountain Complex.

1 Basement complex soils

For the larger part of the area under consideration the soils are derived from the gneisses, schists and granites of the underlying Basement Complex. These soils include those of drift, alluvium and clay plain. There are few sedentary soils, and when found are generally truncated. In many cases transported soil material overlies a weathering zone. Apart from depositional layering, profile development is not marked. The soils are mostly neutral to slightly acid, with little or no lime content. Their organic contents are low, and the carbon/nitrogen ratio wide. The available phosphorus is low, but variable; the better phosphate level in the alluvial soils is probably due to incorporated volcanic material. The potash content is high.

Hill soils. These form the largest mapping unit in the area. Large areas of hill land lie on the principal watersheds and flank the volcanic massif. The inselbergs of the peneplain are also included in this unit.

The hills are mainly granitic gneiss, but may contain intrusive granites, resistant schists and quartzite. The topography is rough, with steep-sided hills and rocky crests and buttresses. Some of the slopes are terraced. The soils are thin or absent.

Sedentary soils of the foothills. These are the low, rolling hills, lying across the watersheds at their lowest points. The topography is gently rolling, with an insequent dendritic drainage pattern. Because the permeable nature of the soil mantle prevents high run-off, the slopes are convex and the watercourses are neither steep-sided nor deeply incised.

The soils are mainly sedentary and formed from a truncated weathering mantle over the granitic gneiss. The parent rock is easily weathered, so there are few rock outcrops in the area.

Gravel clay soils of the south-west. These soils are formed on the wide and gently sloping foot slopes between the southern hill masses and the clay plains of the Debarei and Saleh basins. Run-off is rapid, as a consequence the main drainage lines are fringed by a gullied zone. The underlying rock is often exposed in the beds of the deeper watercourses.

The soils are formed by a combination of sedentary weathering and slope wash. The bulk of the matrix

consists of a fine gravelly clay, with a down-slope deepening of the profile, and an increase in clay content. The soil substrate may be either the truncated weathering zone of the underlying rock, or a drift gravel accumulation from an earlier phase of weathering.

Clay plain soils. These soils are the dissected remnants of a once continuous plain of dark alluvial clays occupying the floor of the Upper Azum and Debarei basins. The topography is gently undulating and much dissected, especially in the Upper Azum basin, where some of the watercourses have cut down to the underlying rock, and are fringed with back-cutting gullies.

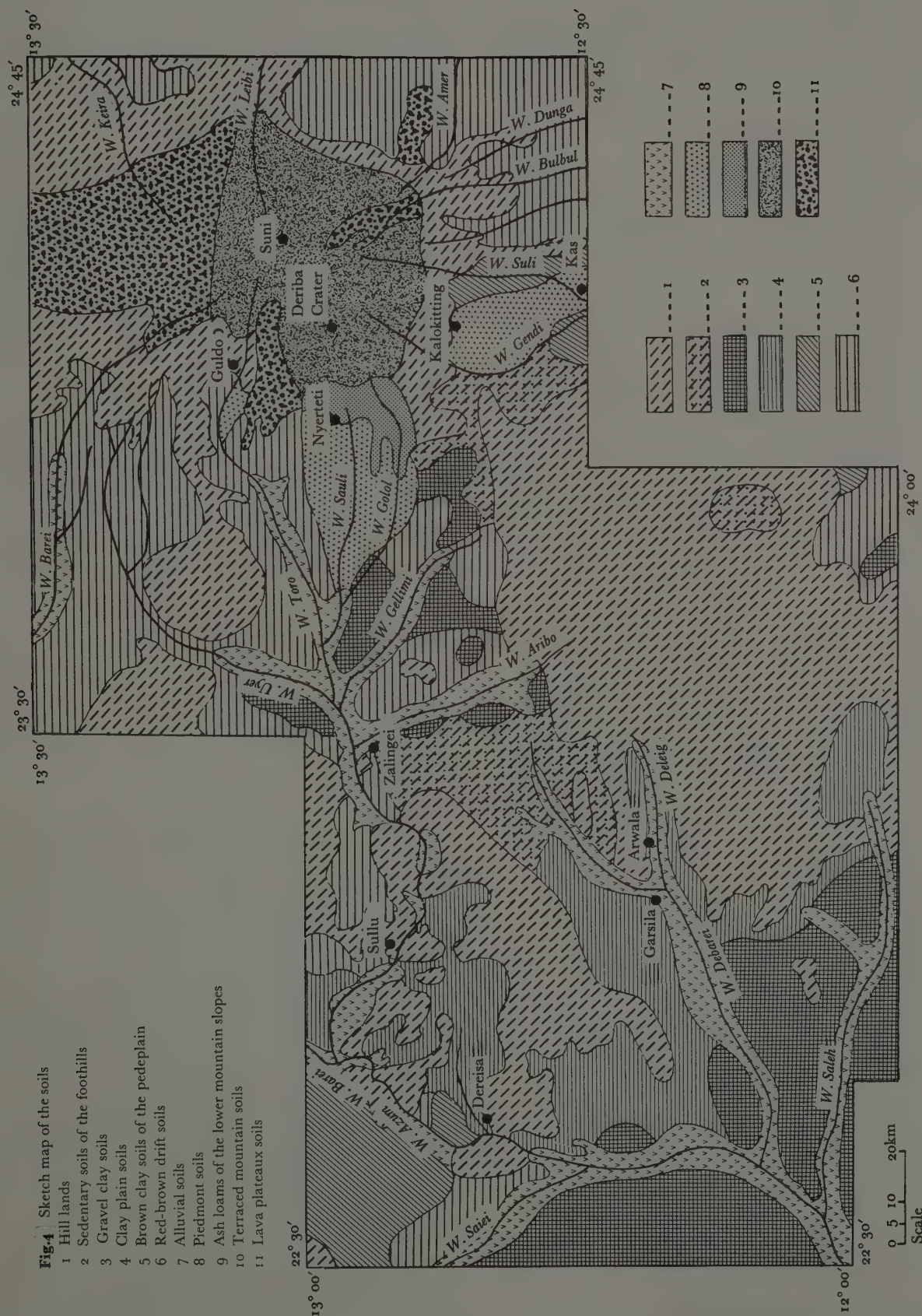
The thickness of the clay mantle on the plain seldom appears to exceed 3 m, and it may lie over a fresh basement surface, a truncated weathering zone or an accumulation of gravel drift. The clays have accumulated as slope wash from the adjacent Basement Complex.

In the Upper Azum basin, processes other than slope wash are held responsible. One profile examined showed a dark sedentary clay developed from feldspathic gneiss, with quartz veins that continued undisturbed into the clay. The upper part of the profile had received material by slope wash, including a fraction of coarse angular grit. Soil creep in the upper layer had truncated the weathering zone and bent over the ends of the quartz veins. Thus, the upper clay layer was at some period the land surface, which was later truncated by aerial processes. The clays were then overlain by coarse, stony, Basement Complex drift, which probably dates from the uplift and dissection of the clay plain.

Unlike the clay plains of the Nile and Kordofan, calcium carbonate concretions are rarely found in the profile. The soils are poorly structured, and become extremely hard and dry during the dry season. The cracking is less marked than the term 'grey cracking clays', used in the Phase I survey (Hunting Technical Services, 1958) implies.

Brown clay soils of the peneplain. These soils are widespread on the low interfluvies of the regrading peneplain of the drier areas to the north-west of the area and around Kas. They are similar to the clay plain soils, but differ in being lighter in colour, browner, more variable in texture, and tending to have a higher sand and gravel content.

The soils are formed from slope wash material initially weathered in situ. The substrate may be a truncated weathering zone of Basement Complex rock



or gravel drift. These soils have been formed under lower rainfall conditions than the clay plain soils, with little or no leaching.

Red-brown drift soils. This is a broad unit and includes the more recent transported mantles. They post-date the clay plain soils; their formation followed the uplift which resulted in the dissection of the clay plains. The topography is undulating and much dissected, with large areas of truncated soils.

Alluvial soils. This includes the soils of the wadi terraces, the alluvium of the hill valleys, and alluvial fans.

The lower terraces and flood plains of the major wadis are formed from recent deposits of predominantly coarse sand and gravel derived from the Basement Complex. The upper terrace is the dissected remnant of a previously more extensive formation and is mainly composed of a red-brown, silty clay and containing some recognizable layered ash and pumice. There are occasional outcrops of Basement Complex rocks, and the terrace appears to be lying on a rock-cut bench, the level of which is above that of the present wadi bed. Although ground water is present in the lower terraces and flood plain, often within a metre or less from the surface, no ground water has been found in the upper terrace. In the past a slumping of the adjacent soil mantle to form a distinct colluvial bench has also been mistaken for old river terraces (Radwanski & Wickens, 1967).

The hill valley alluvium occurs as narrow strips or small pockets in the valleys of the Basement Complex hills. They are recent deposits of local origin.

The alluvial fans found to the east of Kas are elongated areas of low relief along the drainage lines. They have been formed where wadis debouch onto the peneplain and have spread their silt load. The deposits are generally thin, alternating layers of silt and fine sand, predominantly of Basement Complex origin, and highly micaceous. These fans are too small to be included in the sketch map (Fig. 4).

2 Aeolian Sands

In the north-west, during the Pleistocene sand invasion, a number of trailing dunes were formed on the brown clay peneplain, to the leeward side of the small inselbergs. The dunes are aligned in a north-east to south-west direction, as in Kordofan (Hunting Technical Services, 1964). They are superimposed over the drainage pattern, which has now broken through again in a number of places. Similar trailing dunes have been observed from the air to the east of Nyala.

In the north-east of the area, a thin, gently undulating, sand sheet extends to the foot of the Jebel Marra massif, and overlies the soils of the peneplain land surface.

The soils formed from the wind-blown sands are neutral to slightly alkaline, deficient in nitrogen and phosphorus and with only a moderate potash content.

3 Volcanic Mountain Complex

The soils of the volcanic mountain complex have

developed either from air-borne ash, or formed sedimentary clays from the lavas. The clays occur mainly to the north. On the piedmont plains to the south and west of the massif, ash mixed with Basement Complex material has been water-laid in some horizons. There have also been periodic ash falls, and buried soils have been found. Apart from this depositional layering, profile development is not well marked. The surface horizon has a visibly higher organic content, and is often lighter in texture. Some of the sub-surface horizons have an incipient cementation.

The soils are generally slightly acid in reaction. There is a slight tendency for soils to increase in acidity with altitude. The lime content is low. The soluble salt levels are also low, except at sites associated with alkaline seepage. The organic contents are low, and the carbon/nitrogen ratios wide. The phosphorus levels are high; traces of apatite have been identified in the ashes. This mineral seems to originate in the volcanic suite of rocks and probably is the source of the high phosphorus content of the volcanic rocks and also of some of the alluvial soils (Jewitt, 1950). Extractable potash levels are high, but lower than those of the alluvial soils. Deficiencies of copper, zinc and boron have been observed.

Datum soils of the piedmont plain. The soils of the western and southern piedmont blocks have developed on the smooth-lying surfaces of the remnants of a once continuous piedmont plain. The blocks appear as plateau interfluvies separated by deeply incised drainage lines with wide, flanking gully zones.

The piedmont deposits were laid down as thick wedges of alluvial and colluvial material during the erosion intervals that followed the major developments of the volcanic massif, and associated uplifts. The deposits include interbedded gravels, boulder beds, ash bands and silts, of both volcanic and basement complex origin.

Before the dissection of the plains, shallow ponds formed on the surface, also a shallow, dendritic drainage pattern. These ponds and drainage lines were later filled, and the whole plain blanketed by falls of ash. The old grass-covered drainage lines, fringed by trees, are readily visible from the air, but not from the ground (Wickens & Collier, 1971).

The regraded drainage has deeply dissected the piedmont deposits, cutting down to the underlying basement rock, leaving a number of isolated, gently sloping blocks. These blocks are very unstable, and are being rapidly eroded at the periphery.

The soils are mostly ash-loams that have developed from the last deposit of volcanic ash; bands of fresh pumice are found in some of the profiles. Substrates include coarse, relatively unweathered bedded ash, cemented, partly decomposed ash, often lying over a thin band of clay, as well as Basement Complex sands and gravels.

Ash loams of the lower mountain slopes. These soils are found mainly on the western flank of the massif, between the foot of the steeply terraced hill lands and the piedmont plains. The topography is that of gently

sloping flow-tops, which are deeply dissected by parallel, steeply falling, perennial streams.

The soils are formed from an overlying ash blanket. The substrate is of lava flow-top and cobble. The soils are similar to those of the piedmont.

Terraced mountain soils. These soils are very variable, but are generally shallow, stony ash-loams, and are found on the terraced slopes that are to be found in virtually all the accessible slopes of the massif where agriculture is practised.

The soils are predominantly ash overlying cemented ash, clay, basalt boulders and cobble. A red clayey soil derived from weathered lava occurs in some sites.

Soils of the lava plateau. These soils are found on the level flow-tops at the foot of the massif, mainly to the north and north-east of the massif, on the now very much dissected lava flows that were formed during the early stages of volcanic activity. Smaller areas of lava flow occur on the eastern and southern faces of the massif. These flows were much more extensive, remnants of which now remain as flat caps to some of the Basement Complex hills, often a hundred or so metres above the adjacent plain or valley floor.

The soils are generally very stony and clayey in texture. In some cases there may be a surface layer of ash soil. The clays are clearly sedentary, typically dark, reddish-brown, but on sites with impeded drainage the

soils tend to be grey to grey-brown.

Soils of the high altitude ash plain. There are four, relatively level areas of soil developed over deep layered ash and pumice deposits lying between 2300 and 2600 m. These soils are the water-laid ash deposits within the Deriba crater and a similar deposit within the small crater above Gur Lambang; the gently rolling ash and pumice plain lying on a lava ledge at Tora Tonga and the deep ash and pumice plain of Tereng.

Miscellaneous units. The soils comprising this unit are the particularly drastically eroded lands of the volcanic complex. The soils are stripped, truncated or gullied. They include the *Dissected piedmont lands*, the intensively gullied land around the periphery of the piedmont blocks; *Broken lava lands*, the deeply dissected lava flows on the lower flanks and at the foot of the mountain; *Ash badlands*, these form an arc from the north-west to the east and south of the Deriba crater, the thick accumulations of ash and pumice have been very severely eroded and the vertical walls of the gullies are sometimes over 50 m high; finally the *Steep mountain slopes*, which include the rim and buttresses of the main crater, the interbedded ashes and lavas of Jebel Uwo and other high altitude peaks, and scattered cones and plugs on the flanks of the massif. All are too steep for cultivation.

Chapter 6

Climate

The main factor determining the climate of the region is the seasonal shift of the Inter-Tropical Convergence Zone, the front of which moves with the changing zenithal position of the sun, with a time lag of between four to six weeks. During the winter months, from October to March, pressure is high over the Sahara and the dry north winds blow across the Sudan towards the Inter-Tropical Convergence Zone, which may lie as far to the south as the Tropic of Capricorn. With the advance of the sun towards the summer solstice, the zone of convergence of northerly and southerly air streams moves northwards across the Sudan and moist, unstable air is drawn in from the South Atlantic Ocean (Barbour, 1961).

The high Jebel Marra massif strongly modifies the regional climate and increases the amount of precipitation; the highest rainfall occurs on the western slopes of the massif. The isohyets are shown in Fig. 5, and have been taken from the map prepared for the United Nations Special Fund Jebel Marra Project by Bakker (1968); the basic data used in the preparation of the map is unfortunately not available. Rainfall is almost entirely during the period May to September, with 60 percent of the rainfall during the months of July and August. A ridge of high rainfall extends from the western slope of the massif (over 1000 mm) towards the south-western corner of the survey area (800 mm), while most of the area has a rainfall of between 600 and 700 mm. In the north-east corner of the area the rainfall falls off to below 400 mm. Variability from year to year is relatively small, with a total precipitation of below 94 percent, or above 110 percent of the normal to be expected every three years.

The average temperature at Zalingei varies between 20°C in winter and 27°C at the beginning of the rains in May-June. The average diurnal variation is greatest during the winter dry season (28°C) and least during the rains (August, 10°C). The average maximum

temperatures are lowest in the rains (August, 29°C), rising to 34°C in December and 38°C in April. The average minimum temperatures are lowest in December and January, 6°C, and highest in June and July, 19°C. Temperature observations at other stations within the survey area are over too short a period to provide reliable norms, however, the lapse rate for the Jebel Marra massif appears to be about 0.6°C per 100 m.

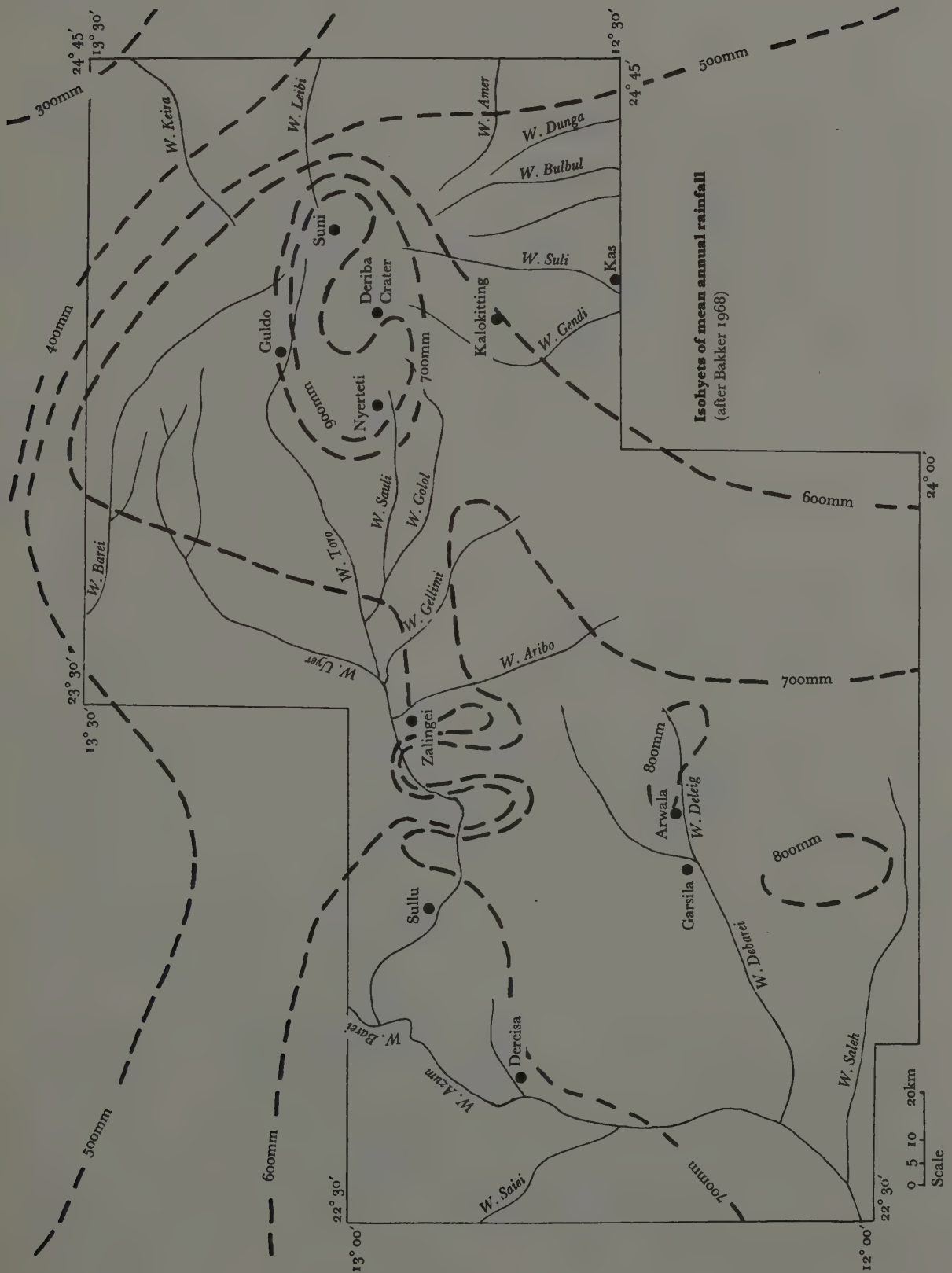
Severe night frosts are experienced at higher altitudes. Lynes (1924) has recorded a night temperature of -8°C at 2750 m during February. Night frosts also occur in the lower valleys, especially in the depressions. At Zalingei the temperature in the wadi bed can be as much as 4°C lower than the recorded screen temperature in the town. Frosts can be expected to occur along the course of the Wadi Azum as far as the Dereisa Gorge as well as over the southern piedmont as far south as Kas. Localized hail storms may also be experienced.

Mean surface winds are less strong within the survey area than in the surrounding area. The Jebel Marra massif acts as a shield to the northerly winds, evidence for which is the almost total absence of aeolian sands within the survey area except on the eastern flank of the massif and in the far north-west corner. Wind strength however does not appear to increase with altitude.

The relative humidity is generally low. At Zalingei the potential evapo-transpiration is probably in the order of 170 cm per annum, with a maximum of 20 cm in May and a minimum of 8 cm in December and January.

The meteorological observations recorded during 1963 to 1967 by the United Nations investigation team are not available to the writer. The climatic conditions described, unless otherwise stated, have been extracted from a summary contained in the Final Report (FAO, 1968).

Fig. 5 Isohyets of mean annual rainfall (after Bakker, 1968).



Chapter 7

Vegetation

I Introduction to the vegetation of the Sudan

The vegetation of the Sudan has been ably described by Harrison & Jackson (1958). These authors have deliberately avoided the use of conventional community terminology in order not to become involved in any particular hierarchical classification (J. K. Jackson, verbal information, 1963). Their classification system functions perfectly for small scale maps, e.g. 1:4,000,000 but becomes impractical when mapping at larger scales such as 1:250,000, although there is no difficulty in adapting it for more detailed work.

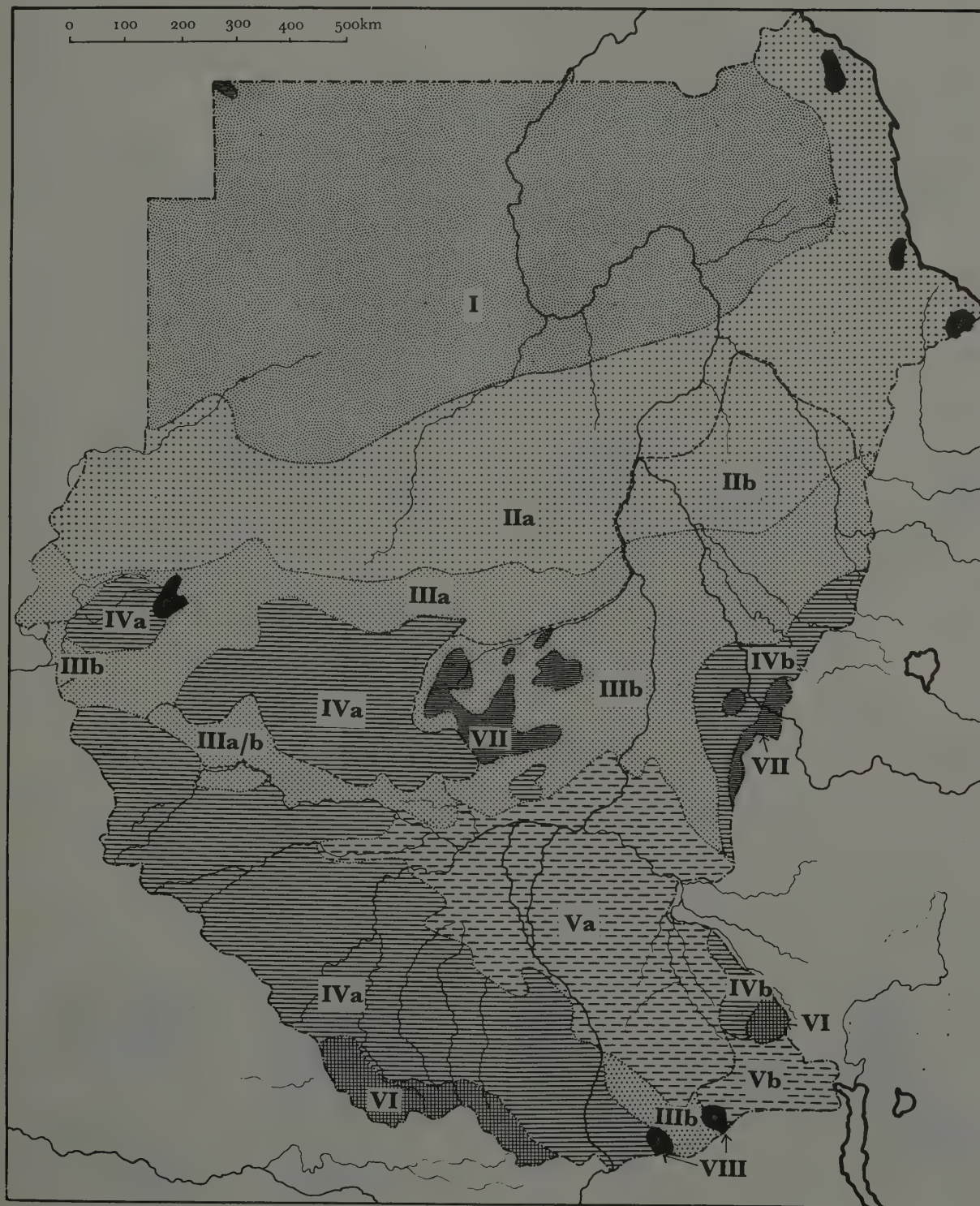
A modified version of Harrison & Jackson's map is shown in Fig. 6, in which a number of vegetation units are recognized at formation level. These vegetation units are as follows:

- I *Desert*: average rainfall less than 75 mm per annum, and the vegetation, if any, confined to the seasonal watercourses.
- II *Semi-desert scrub and grassland*
 - A *on lithosols*: average rainfall from 75 to 250 mm per annum. Scrub vegetation includes such species as *Acacia tortilis* subsp. *tortilis*, *Leptadenia pyrotechnica*, *Salvadora persica*, with *Aristida* spp. as the dominant grasses; *Panicum turgidum* occurs on the sandy soils.
 - B *on clay soils*: average rainfall from 75 to 400 mm. Scrub vegetation includes *Acacia mellifera*, *Capparis decidua*, *Ziziphus spina-christi* and *Balanites aegyptiaca* along the drainage lines, with *Schoenefeldia gracilis* and *Sehima ischaemoides* as the dominant grasses.
- III *Thorn savanna and scrub*
 - A *on sandy soils*: average rainfall 280 to 450 mm. *Acacia senegal* is the dominant tree with *Aristida sieberana* and *Eragrostis* spp. as the dominant grasses.
 - B *on clay soils*: average rainfall 400 to 800 mm. Pure stands of *Acacia mellifera* scrub occur between 400 and 500 mm with *Acacia seyal* and *Balanites aegyptiaca* dominant in the higher rainfall areas. The major grasses include *Schoenefeldia gracilis*, *Cymbopogon* spp. and *Brachiaria obtusiflora*.
- IV *Deciduous savanna woodland*
 - A *on latosols*: average rainfall 450 to 1300 mm. *Combretum glutinosum*, *Anogeissus leiocarpus*, *Terminalia brownii*, *Albizia amara* subsp. *sericocephala*, *Khaya senegalensis* and *Isobertlinia doka* are the major tree constituents, with *Aristida* spp., *Eragrostis* spp., *Pennisetum* spp. and *Hypparrhenia* spp. among the important grasses.
- B *on clay soils*: average rainfall 800 to 1000 mm. The major tree species are *Combretum hartmannianum* and *Anogeissus leiocarpus*, with *Hypparrhenia* spp. as the dominant grasses.
- V *Flood region*
 - A *Swamp and wetland savanna*: average rainfall 800 to 1000 mm. Includes the perennial *Cyperus papyrus* swamps of the 'sudd' and the seasonally flooded 'toich' area with *Hyphaene thebaica*, *Borassus aethiopum*, *Acacia seyal*, *A. sieberana* and *Balanites aegyptiaca* among the tree species present (see Jonglei Investigation Team, 1954 for further details).
 - B *Grassland*: average rainfall over 1000 mm. Known as the Toposa area, with *Hypparrhenia* spp., *Setaria* spp., *Chrysopogon plumulosus* (= *C. aucheri* var. *quinqueplumis*), *Bothriochloa insculpta*, etc., among the more important grasses, with thickets of *Acacia mellifera* also present.
- VI *Lowland forest*: average rainfall over 1300 mm. Consisting of small relic forest areas at Lotti, Laboni, Talanga, Azza and Aloma Plateau with *Celtis zenkeri*, *Chrysophyllum albidum*, etc., and also including areas derived from forest with *Albizia zygia*, *Vitex doniana*, *Terminalia glaucescens*, etc.
- VII *Hill vegetation*: regarded as isolated areas of savanna and woodland vegetation surviving on hill slopes in areas where similar communities are no longer to be found in the surrounding lowlands.
- VIII *Montane vegetation*: upland areas often with temperate and tropical species that are only known from similar upland areas in Africa.

The flora of Jebel 'Uweinat has recently been studied by Léonard (1969) and Osborn & Krombein (1969) while the Nuba Mountains and the Boma Plateau are still virtually unknown botanically. All three appear to have predominantly hill floras with a few relic species that are indicative of more mesophytic conditions in the past.

Fig. 6 Vegetation regions of the Sudan

- | | | |
|------------------------------------|-------------------------------|--|
| i Desert | iv Deciduous savanna woodland | vi Lowland forest, including areas derived from forest |
| ii Semi-desert scrub and grassland | a-on latosols | vii Hill vegetation |
| a-on lithosols | b-on clay soils | viii Montane vegetation |
| b-on clay soils | v Flood region | |
| iii Thorn savanna and scrub | a-swamp and wetland savanna | |
| a-on sandy soils | b-grassland | |
| b-on clay soils | | |



The montane areas include the Dongotona and Didinga Hills and the Imatong Mountains, studied by Jackson (1950, 1951 & 1956); the Red Sea Hills, studied by Kassas (1956) and Jebel Marra.

2 Vegetation of the Jebel Marra survey area

Harrison & Jackson (1958) have rather cursorily described the area surrounding the Jebel Marra massif as 'Hill Catena'. Ramsay (1958) has given a rather more detailed breakdown of the area into the following three associations: (1) *Anogeissus* – *Acacia seyal* – *Lannea* – *Albizia* Association, (2) *Albizia* – *Acacia seyal* – *Acacia senegal* – *Acacia mellifera* Association and (3) *Acacia mellifera* – *Commiphora* – *Acacia nubica* – *Acacia tortilis* Association. Ramsay, however, had failed to appreciate the significant differences of the communities occurring on such widely different soils as ash piedmont, clay and skeletal basement complex. The 'Forest Map' produced by Hunting Technical Services (1958) was not intended to be an accurate map of the vegetation communities, rather to show the distribution of certain economic trees; in practice it portrays the communities far more accurately than Ramsay and was used by the writer as a framework for the 1:250,000 Vegetation Map of the United Nations Special Fund Project. This map is published with the Final Report for the Project (FAO, 1968).

The system of classification followed (Table 1) is that used by the writer for the United Nations Kordo-

fan Special Fund Project (Hunting Technical Services, 1964) and the United Nations Special Fund Jebel Marra Project (Hunting Technical Services, 1968). The physiognomic types recognized are illustrated in Fig. 7. A brief description summarized from Hunting Technical Services (1968) of the major lowland vegetation units will be given, followed by a more detailed description for the Jebel Marra massif.

(a) Vegetation of the Lowlands.

The principal associations recognized on the lowland plain are:

- I *Acacia mellifera* – *Commiphora africana* on indurated soils.
- II *Acacia mellifera* on hill soils of the basement complex.
- III *Acacia senegal* – *Combretum glutinosum* on aeolian sand.
- IV *Acacia seyal* – *Balanites aegyptiaca* on clay soils.
- V *Acacia albida* on alluvial soils.
- VI *Balanites aegyptiaca* on alluvial soils.
- VII *Combretum glutinosum* – *Guiera senegalensis* on Nubian sandstone soils.
- VIII *Anogeissus leiocarpus* on basement complex soils.
- IX *Anogeissus leiocarpus* – *Boswellia papyrifera* on hill soils of the basement complex.

Their distribution is shown on the sketch map (Fig. 8) with the exception of III and VII, which are too small to be shown at the scale of the sketch map.

Table 1 System of classification of vegetation

Formation-type	Formation	Sub-formation	Association
Tropical thornland	Thorn scrub	<i>Acacia mellifera</i> thornland	I <i>Acacia mellifera</i> – <i>Commiphora africana</i> on indurated soils. II <i>Acacia mellifera</i> on hill soils of the basement complex. III <i>Acacia mellifera</i> hill thornland on volcanic soils of the Jebel Marra massif.
		Thorn savanna	I <i>Acacia senegal</i> – <i>Combretum glutinosum</i> on aeolian sand.
	Thorn woodland	<i>Acacia seyal</i> – <i>Balanites</i> thorn savanna	I <i>Acacia seyal</i> – <i>Balanites</i> on clay soils. II <i>Acacia seyal</i> – <i>Anogeissus</i> on basement complex soil mosaic.
		<i>Acacia albida</i> thorn woodland	I <i>Acacia albida</i> on piedmont ash soils.
	Savanna woodland	Riparian woodland	I <i>Acacia albida</i> on alluvial soils. II <i>Balanites aegyptiaca</i> on alluvial soils.
		<i>Combretum</i> – <i>Albizia</i> – <i>Terminalia</i> savanna woodland	I <i>Combretum glutinosum</i> – <i>Guiera senegalensis</i> on Nubian sandstone soils. II <i>Combretum glutinosum</i> – <i>Terminalia laxiflora</i> on piedmont ash soils.
Tropical savanna	Savanna woodland	<i>Anogeissus leiocarpus</i> savanna woodland	I <i>Anogeissus leiocarpus</i> on lowland basement complex soils. II <i>Anogeissus leiocarpus</i> – <i>Boswellia papyrifera</i> on hill soils of the basement complex. III <i>Anogeissus leiocarpus</i> hill savanna on volcanic soils of the Jebel Marra massif.
Tropical forest	Lowland forest	Gallery forest	<i>Trema-Syzygium</i> gallery forests of the Jebel Marra massif.
Montane	Afro-montane vegetation	Montane grassland	Upland grassland and upland meadow on volcanic soils of the Jebel Marra massif.

Fig. 7 Profile descriptions of physiognomic types.

A, Thorn savanna: clump grasses with scattered thorn (predominantly *Acacia*) trees.

B, Thorn scrub: grass with scattered to dense thorn (predominantly *Acacia*) shrubs.

C, Thorn woodland: grass with thorn trees forming an almost closed canopy.

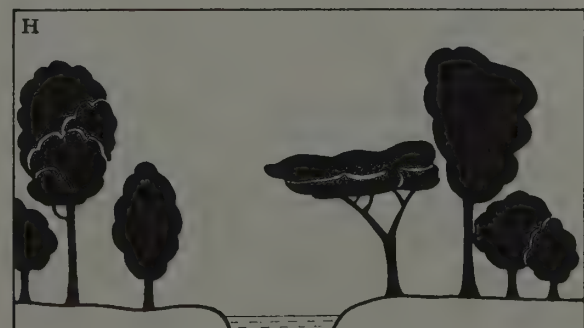
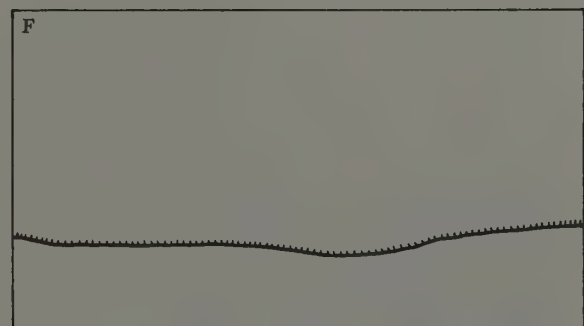
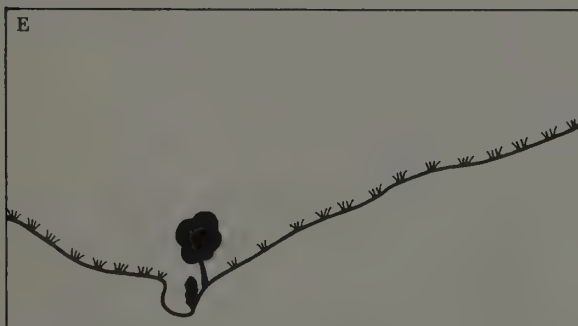
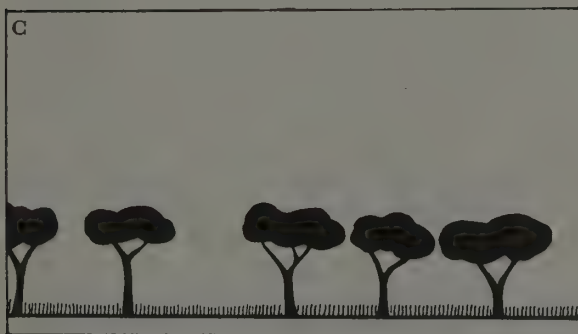
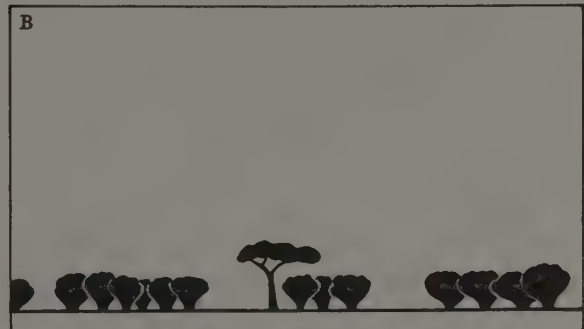
D, Savanna woodland: deciduous (mainly non-thorny) trees with a close, but not closed, canopy.

E, Upland grassland: montane vegetation of grasses and herbs which do not form a closed sward.

F, Upland meadow: montane vegetation of grasses and herbs forming a closed sward.

G, Gallery forest: riverine tree vegetation, often stratified, having a more equatorial origin than the surrounding vegetation.

H, Riparian woodland: riverine tree vegetation of similar origin to the surrounding vegetation.



(i) *Acacia mellifera* – *Commiphora africana* Association on indurated soils

This association is widely represented in the low rainfall areas of the Sudan. It is found on the eastern, northern and north-western borders of the survey area, on the truncated and indurated red-brown drift and brown clay soils of the peneplain.

Acacia mellifera is the dominant species, often forming dense stands, but not attaining the impenetrable density found on similar soils in Kordofan. Associated tree and shrub species are *Commiphora africana*, *Acacia nubica*, *A. senegal*, *A. seyal*, *A. tortilis* subsp. *spirocarpa*, *Albizia amara* subsp. *sericocephala*, *Dalbergia melanoxylon*, *Ziziphus* spp. and *Lannea humilis*.

The grass cover is rather sparse and tends to be restricted to areas of rain-washed sand. The more frequent and characteristic grasses present are *Aristida adscensionis*, *A. rhiniochloa*, *Cymbopogon proximus*, *Schoenefeldia gracilis*, *Loudetia togoensis* and *Chloris gayana*.

To the north of the western flanks of the massif the association forms a complex mosaic with that of *Anogeissus leiocarpus*. A simplified cross-section of an interfluvium within this mosaic would show *Acacia mellifera* dominating the crown and *Anogeissus leiocarpus* flanking the drainage lines.

(ii) *Acacia mellifera* Association on hill soils of the basement complex

This association occurs on the lower eastern flanks of the Jebel Marra massif and in the granite hills to the north of the massif, beyond the survey area. The dominant species is *Acacia mellifera*, which generally occurs in pure stands of almost impenetrable thicket. Other tree species found include *Acacia nilotica* subsp. *adansonii*, *A. seyal*, *Balanites aegyptiaca*, *Commiphora africana*, *Albizia amara* subsp. *sericocephala*, *Dichrostachys cinerea* subsp. *africana*, *Boswellia papyrifera*, *Terminalia brownii* and *Anogeissus leiocarpus*. The eastern flanks of the massif show signs of extensive terracing, long ago abandoned for cultivation. Today the poor stony soils are quite unsuitable for cultivation, although they must have been useable in the past. The high rainfall, 700 mm, and the presence of occasional *Anogeissus leiocarpus* and *Terminalia brownii* is suggestive that extensive soil erosion has so reduced the moisture holding capacity of the soil that *Acacia mellifera* has encroached onto what was once a more mesophytic type of vegetation.

The more frequent and characteristic grass species present, albeit rather sparse on the ground, are *Aristida adscensionis*, *Aristida rhiniochloa*, *Sporobolus festinus* and *Tetrapogon cenchroidiformis*.

(iii) *Acacia senegal* – *Combretum glutinosum* Association on aeolian sands

The *Acacia senegal* thorn savanna on sand sub-formation is well represented in the low rainfall belt of aeolian sands lying between 13° and 14°N in both Darfur and Kordofan provinces and extending westwards to the Niger. In the survey area it is restricted to the sand shadows that have formed on the lee side of the

numerous quartz jebels (hills) found in the north-west corner, to the west of Murnei. The Jebel Marra massif has protected the greater part of our area from the southward drift of sand that occurred during the Pleistocene.

The association, which is too small to be shown on the sketch map (Fig. 8), is represented by *Acacia senegal* and *Combretum glutinosum* being the co-dominant tree species, with *Balanites aegyptiaca*, *Ziziphus* spp. and *Boscia senegalensis* also present; the general aspect is that of open tree savanna.

The major grasses present are *Eragrostis tremula*, *Cenchrus biflorus*, *C. prieurii*, *Aristida rhiniochloa*, *Loudetia togoensis* and *Cymbopogon* sp.

(iv) *Acacia seyal* – *Balanites aegyptiaca* Association on clay soils

This association, which is well represented in the Sudan on the clay plains of the Nile and its major tributaries, is here found on the gravel clays bordering the Wadi Saleh.

Acacia seyal generally occurs in pure stands interspersed by open areas of grassland. The uniform, rather close canopy so characteristic of this association in Kordofan is generally lacking. Occasional tree associates are *Acacia gerrardii*, *Balanites aegyptiaca* and *Albizia amara* subsp. *sericocephala*.

Associated grasses are *Setaria lynesii*, *Panicum subalbidum*, *Brachiaria lata*, *Pennisetum ramosum* and *Hypparrhenia rufa*. Here the large areas dominated by *Cymbopogon* spp., so characteristic of Kordofan, are absent.

On the clay plain and red-brown drift soils of the upper basin of the Wadi Azum system the *Acacia seyal* – *Balanites* forms a mosaic with *Anogeissus* (association VIII, qv.), with *Acacia seyal* dominating the crown of the interfluvies and *Anogeissus* bordering the drainage lines

Fig. 8 Sketch map of the vegetation

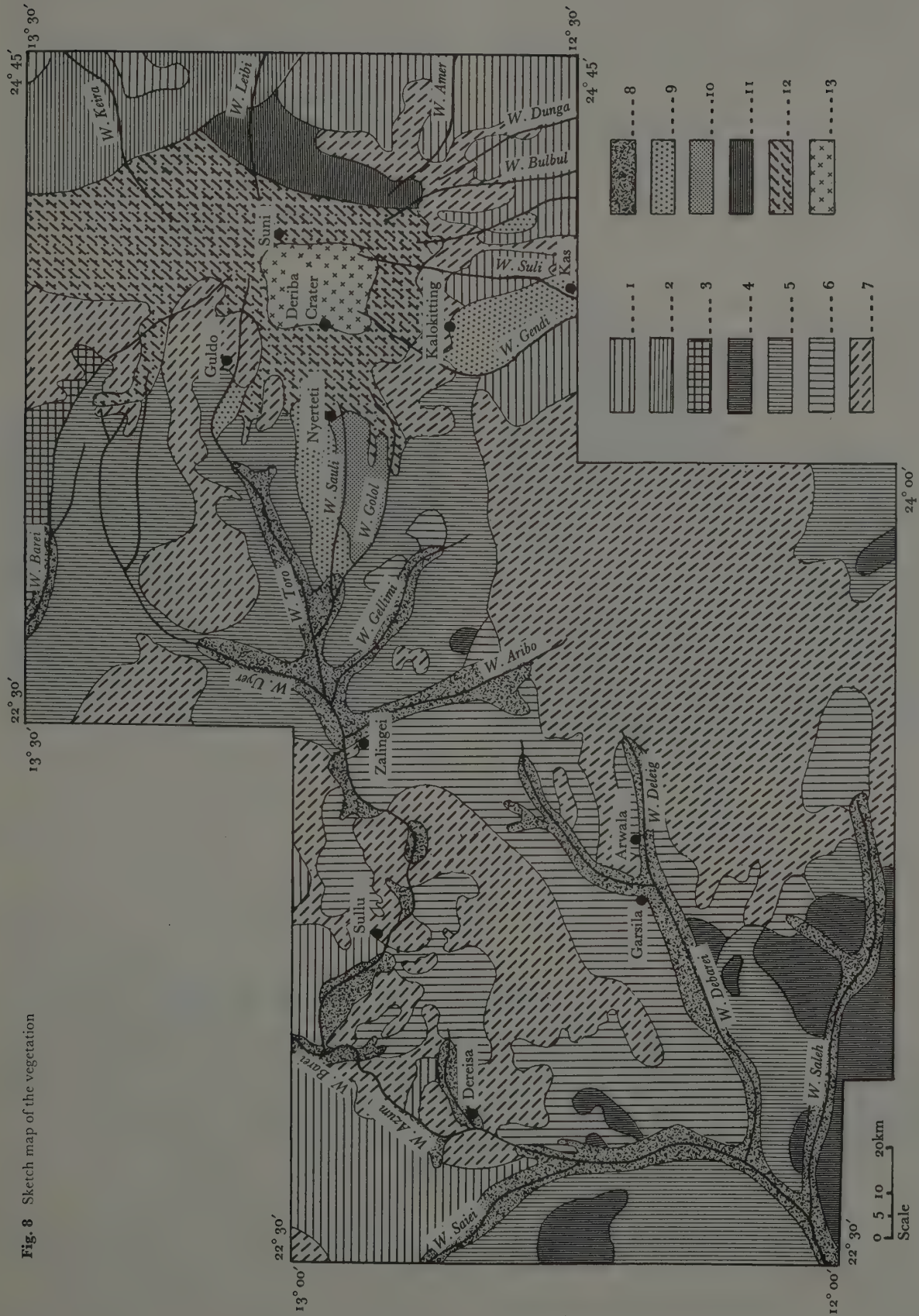
Associations

- 1 *Acacia mellifera* – *Commiphora africana* on indurated soils
- 2 *Acacia mellifera* on hill soils of the basement complex
- 3 *Acacia mellifera* – *Anogeissus leiocarpus* mosaic on basement complex soils
- 4 *Acacia seyal* – *Balanites aegyptiaca* on clay soils
- 5 *Acacia seyal* – *Anogeissus leiocarpus* mosaic on basement complex soils
- 6 *Anogeissus leiocarpus* on basement complex soils
- 7 *Anogeissus leiocarpus* – *Boswellia papyrifera* on basement complex hill soils
- 8 *Acacia albida* – *Balanites aegyptiaca* on alluvial soils
- 9 *Acacia albida* on ash piedmont soils
- 10 *Combretum glutinosum* – *Terminalia laxiflora* on ash piedmont soils
- 11 *Acacia mellifera* on volcanic soils of the Jebel Marra massif
- 12 *Anogeissus leiocarpus* on volcanic soils of the Jebel Marra massif
- 13 Upland grassland and upland meadow on volcanic soils of the Jebel Marra massif

The following two associations are too small to be mapped:

Acacia senegal – *Combretum glutinosum* on aeolian sands, 25 km NW of Dereissa

Combretum glutinosum – *Guiera senegalensis* on Nubian sandstone, 5 km W of Garsila



(Fig. 9). *Lannea humilis* may be locally dominant amidst what would otherwise be pure stands of rather stunted *Acacia seyal*. The inhibited growth of the *Acacia seyal* is probably due to the shallow soils, often less than 1 m deep, overlying the basement complex rocks.

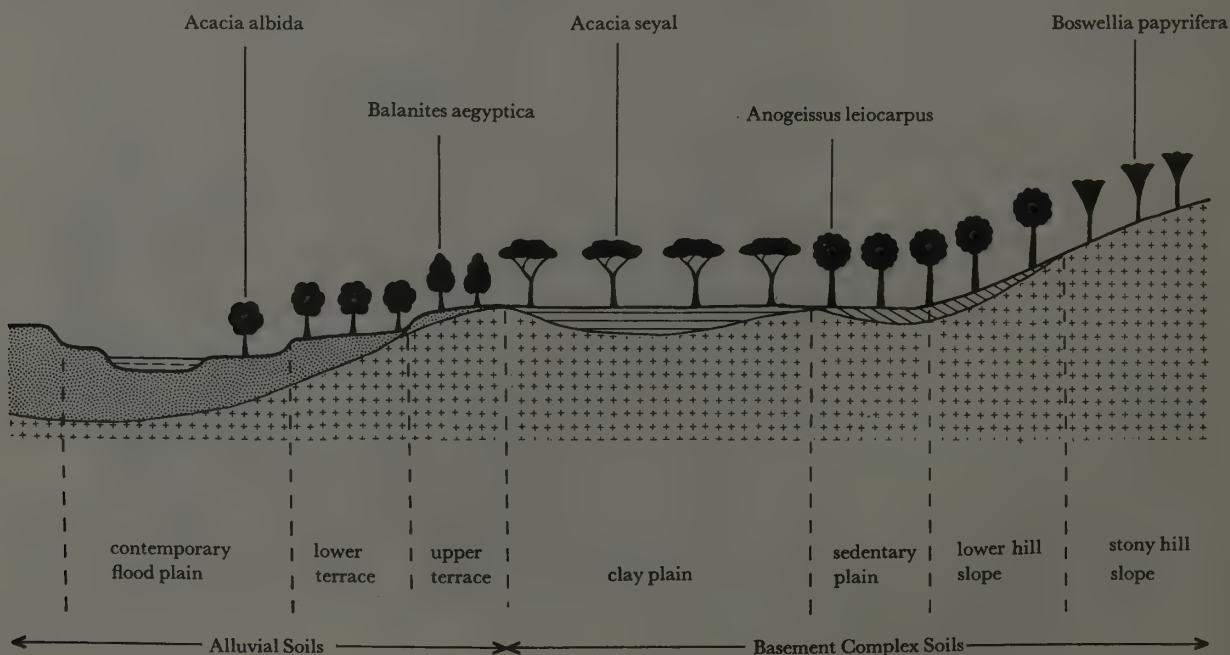
Sporobolus festinus is the dominant grass throughout the area at the beginning of the rains, to be followed by *Microchloa kunthii* on stony soils, which is in turn succeeded by *Loudetia simplex*. *Setaria pallide-fusca* succeeds *Sporobolus festinus* in the shallow depressions, with *Antheophora lynesii* fringing the depressions. Eventually *Hypparrhenia confinis* and *H. rufa* dominate the deeper soils, with *Eragrostis tremula* dominant on the poorer soils.

(v) & (vi) *Acacia albida* Association and *Balanites aegyptiaca* Association on alluvial soils

For convenience these two associations will be described together. For descriptive purposes the terrace soils of the major wadis (rivers) of the Wadi Azum system can be subdivided into three sections: (1) The Upper Azum Catchment, upstream of Kurgula and including the main tributaries, Wadis Aribi, Gellimi and Uyer. (2) Middle Reaches, downstream from Kurgula to the junction with, and including, the Wadi Debarei and (3) Lower Reaches, extending to, and possibly beyond, the Sudan frontier, and including the Wadi Saleh.

In the Upper Azum Catchment the soils of the active flood plain are either bare of vegetation or carry a sparse cover of *Setaria pallide-fusca*. Local swampy areas contain the following grasses and herbs: *Phragmites karka*, *Saccharum spontaneum*, *Echinochloa pyramidalis*, *Arthraxon quartinianus*, *Ludwigia octovalvis*, *Aeschynomene indica*, *Nymphaea lotus*, *N. maculata* and *Ipomoea aquatica*.

Fig. 9 Schematic diagram of the Zalingei area showing the relationship between geomorphology, soils and vegetation.



The lower terraces are dominated by pure stands of *Acacia albida*, often forming a closed canopy (Plate 2). Minor associates are *Ficus* spp., *Kigelia africana*, *Cordia abyssinica*, *Acacia sieberana* and *A. polyacantha* subsp. *campylacantha*. The drier soils of the upper terrace carry a more xerophytic vegetation with *Balanites aegyptiaca* as the dominant species with *Ziziphus spina-christi*, *Acacia gerrardii*, *Albizia amara* subsp. *sericocephala* and *Combretum aculeatum* also present.

The grass cover for both the upper and lower terraces follow the same seasonal sequence. *Sporobolus festinus* is the dominant grass at the start of the rains, later to be succeeded by *Pennisetum pedicellatum*, *Cymbopogon proximus*, *Hypparrhenia* spp. and *Andropogon gayanus*.



Plate 2 A pure stand of mature *Acacia albida* growing on the lower terrace soils at Zalingei.

A transect from near Zalingei (Fig. 10) shows the relationship between the grass species, soils and soil moisture during the early part of the rainy season.

The Middle Reaches carry a similar vegetation (Plate 3) but include a few species such as *Celtis integrifolia* and *Combretum paniculatum* on the lower terrace soils. These species which are more representative of the southern flora of the Sudan are an indication of the pathway by which the more southerly species found on the Jebel Marra massif must have passed. The 800 mm isohyet (Fig. 5) is additional evidence in support of such a migration route.⁽¹⁾

In the Lower Reaches the hitherto pure stands of *Acacia albida* are gradually replaced by a mixture of tree species, although the closed or almost closed canopy is still maintained. There is less distinction between the upper and lower terraces in both elevation and vegetation. There is also an increasing tendency for more species typical of the southern Sudan to be present. Among the more important tree species are *Acacia albida*, *A. sieberana* vars. *sieberana* and *villosa*, *Terminalia laxiflora*, *Combretum paniculatum*, *C. collinum* subsp. *hypopilinum*, *Pterocarpus lucens*, *Pseudocedrela kotschyi*, *Tamarindus indica*, *Cordia abyssinica* and *Prosopis africana*.

In the small clay depressions subject to seasonal flooding, clumps of *Acacia nilotica* subsp. *nilotica* and *Mitragyna inermis* are to be found. *Mimosa pigra* lines the banks of the ox-bow lakes near Amballa, as well

as the banks of the Wadi Saleh near its junction with the Wadi Azum. Pure stands of *Borassus aethiopum* occur on the alluvial delta fans of the tributaries to the Wadi Saleh, where they are favoured not only by the high water table but are also protected by the farmers and hence constitute an edaphic-cultivation climax.

(vii) *Combretum glutinosum* – *Guiera senegalensis* Association on Nubian sandstone soils

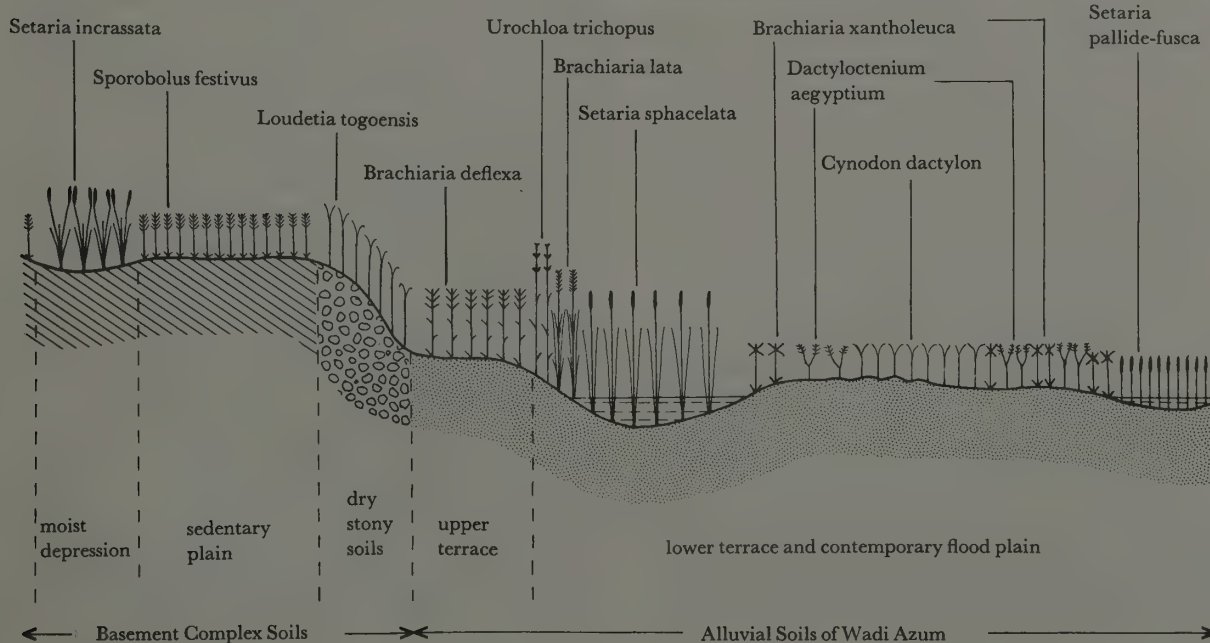
This association, which is better represented in Darfur to the south of Nyala, is here limited to a few acres of Nubian sandstone hills near Garsila. The sandstone hills are dominated by *Combretum glutinosum* with *Dichrostachys cinerea* and *Grewia flavescens* locally domi-



Plate 3 *Acacia albida* regenerating on abandoned fallow, lower terrace soils at Garsila. *Balanites aegyptiaca* and *Ziziphus spina-christi* also present.

(1) Migration route or pathway is used throughout this work to imply an extension of the main distribution of a species due to ameliorating climatic conditions. Subsequent deterioration of the climate would result in isolated outliers to the main distribution occurring in favoured localities.

Fig. 10 Schematic diagram of a transect from basement complex to alluvial soils at Adjakari, near Zalingei.



nant on some of the steeper and better drained slopes. Other associates include *Strychnos spinosa*, *Gardenia lutea*, *Dalbergia melanoxylon*, *Combretum collinum* subsp. *binderanum*, *Boswellia papyrifera* and *Boscia salicifolia*.

The area was visited during the dry season and following a grass fire, consequently the herb and grass flora was not recorded. The area has been occupied in the past for there were ruins of old Tora-type houses on the crests of many of the hills.

The small area of sandy soils enclosed by the encircling ring of sandstone ridges is either under cultivation or lying fallow. *Guiera senegalensis*, a typical shrub of over-cultivated fallow sandy soils, dominates the fallow lands. The ground cover was very sparse, with scattered plants of *Aristida* sp. and *Eragrostis tremula*.

(viii) *Anogeissus leiocarpus* Association on basement complex soils

This is the largest and most important lowland association within the limits of the area investigated, and occurs mainly to the south and east of the Jebel Marra massif. Its best development is to be found on the sedentary soils of the foothills between Zalingei and Arwala, where *Anogeissus leiocarpus* occurs in almost pure stands. The major tree associates of this community are *Combretum glutinosum*, *Terminalia laxiflora*, *Sclerocarya birrea*, *Dalbergia melanoxylon* and *Dichrostachys cinerea*.

The more important grasses present include *Sporobolus festinus*, *Loudetia togoënsis*, *L. simplex*, *Ctenium elegans*, *Hyparrhenia rufa*, *H. confinis* and *Pennisetum pedicellatum*.

In areas of severe denudation, such as occurs around the villages, *Albizia amara* subsp. *sericocephala* becomes dominant, its spread being assisted by means of root suckers and stem coppice regrowth.

(ix) *Anogeissus leiocarpus* – *Boswellia papyrifera* Association on hill soils of the basement complex

This is found along the southern and western fringes of the Jebel Marra massif as well as the Tebella massif and Kobara Hills. Smith (1949) referred to this as the 'Darfur Catena', being a sheet slope under progressive sheet erosion which inevitably passes through the following sequence of less water-demanding species: *Anogeissus leiocarpus*, *Boswellia papyrifera*, *Terminalia brownii*, *Lannea fruticosa*, *Acacia gerrardii* and finally *Albizia amara* subsp. *sericocephala*.

The hill crests are usually dominated by pure stands of *Boswellia papyrifera*, with *Anogeissus leiocarpus* on the flanks, and possibly thickets of *Acacia ataxacantha* at the foot of the scree slopes.

(b) *Vegetation of the Jebel Marra massif*

For the purpose of this study the area of the massif has been extended to include the ash piedmont lying immediately to the south and west of the foothills. The piedmont plains have a particularly rich and interesting flora, with many species in common with the massif. It was from around Nyertete, with its wide

range of habitats, that provided the richest collecting within the entire survey area. The piedmont rises in a series of gentle steps to merge with the lower foothills of the massif.

(1) **VEGETATION OF THE ASH PIEDMONT**
Although a number of distinct communities can be recognized on the piedmont soils, only two are sufficiently large to constitute mapping units that can be shown on the sketch map of the vegetation (Fig. 8). They are the *Acacia albida* and the *Combretum glutinosum* – *Terminalia laxiflora* Associations.

Acacia albida Association on ash piedmont soils

This association is found on the two northernmost blocks of the western piedmont and also on the southern piedmont. These northern blocks of the western piedmont have been extensively cultivated in the past, as is evident from the traces of former field boundaries, camp sites, etc., although today cultivation is limited to the immediate vicinity of a few villages such as Nyertete, Guldo and Kibi. The general appearance of the vegetation would suggest that the area was abandoned between fifty and a hundred years ago. The life span of *Acacia albida* in Darfur is from seventy to ninety years (Wickens, 1969a) and the stands of *Acacia albida* on the piedmont blocks could certainly be termed mature to over-mature. The state of the vegetation when abandoned is not known, but assuming that community life has little changed during the past century, there would have been very little vegetation cover remaining. Thus, assuming complete recolonization had to take place, the area must have been depopulated nearly a century ago. This date is supported by Boustead (1939), who writing about the 1880's says 'Western Darfur was during the period thrown into a state of the utmost confusion by Ta'aisha raids, which ravaged the Fur villages, where stone wall remains may now be seen strewn along the lower foothills of the western slopes of the Marra Mountain. Innumerable large villages and vast tracts of country were depopulated and have remained deserted ever since. This was in the midst of the Mahdia.'

Although the southern piedmont was also probably abandoned during the Mahdist era, it has since been reoccupied and is now being intensively cultivated. This reoccupation was probably encouraged by the proximity of the expanding townships of Kas and Nyala, which provide ready markets for the produce from these fertile and easily worked soils.

Acacia albida is the dominant tree, either present in pure stands of mature trees with little sign of natural regeneration, or as scattered individuals of the younger age classes, especially in the areas of former cultivation. *Balanites aegyptiaca* and *Ziziphus spina-christi* are locally dominant, the latter forming characteristic ring clumps. Dense thickets of *Dichrostachys cinerea* would probably have developed but for the annual grass fires that sweep through the area, killing off the growth from the root suckers. *Azanza garckeana*, *Acacia sieberana*,

A. nilotica subsp. *adansonii*, *Dombeya quinqueseta* and *Cordia abyssinica* are other minor tree associates.

Where the vegetation has been severely degraded, as on the southern piedmont, *Balanites aegyptiaca*, *Ziziphus spina-christi* and *Z. abyssinica* are the dominant species, with *Albizia amara* subsp. *sericocephala*, *Acacia albida*, *A. nilotica* subsp. *adansonii*, *A. seyal* and *Dichrostachys cinerea* also present, while *Acacia nubica* becomes dominant on the old fallow lands on the alluvial fans. Pure stands of *Acacia albida* still occur on the southern piedmont, but these are mature trees and there are few signs that any natural regeneration is likely to take place.

At the start of the rainy season the grass cover is mainly *Dactyloctenium aegyptium*, *Cynodon dactylon* and *Setaria pallide-fusca*, later succeeded by *Hyparrhenia filipendula*, *H. anthistirioides*, *Andropogon gayanus* and *Cymbopogon giganteus*.

Combretum glutinosum – *Terminalia laxiflora* Association on ash piedmont soils

This association is found on the remaining western blocks, where it forms a rather varied and open savanna woodland. *Combretum glutinosum* is locally dominant as well as being generally distributed throughout the area; the seedling stages are abundantly represented. *Terminalia laxiflora*, although equally widely distributed, is more frequent on the rather poorly drained ash soils near Mortagello. *Azanza garckeana* is locally dominant and is regarded as an indication of former settlements; it propagates very freely by means of root suckers. *Ficus* spp., *Acacia sieberana*, *Dombeya quinqueseta*, *Albizia aylmeri*, *Piliostigma thonningii*, *Ziziphus spina-christi*, *Stereospermum kunthianum* and *Securidaca longepedunculata* are other minor tree associates.

In areas with a high water table and protected from the annual grass fires, *Khaya senegalensis* is regenerating naturally. But for fire it is believed that *Anogeissus leiocarpus* would be the dominant species; occasional trees are present throughout the area and its seeds are everywhere to be seen but natural regeneration is very slow indeed. Keay (1949), working in northern Nigeria, found young *Anogeissus leiocarpus* very sensitive to fire; the older trees were much more tolerant. Fire has also controlled *Dichrostachys cinerea* which would otherwise have formed dense thickets from its numerous root suckers.

Although by no means abundant, *Elionurus hirtifolius* is very conspicuous during the dry season for it is the only grass growing and flowering at that time. The geophytes, *Urginea altissima* and *Senecio tuberosus* are among the first plants to appear at the start of the rains, soon to be followed by *Haemanthus multiflorus*. *Sporobolus festinus* is the dominant grass throughout the entire area early in the rainy season, followed by the taller *Antheophora lynesii*, *Hyparrhenia* spp., *Ctenium newtonii*, *C. somalense*, *Andropogon gayanus*, *Brachiaria brizantha*, *Cymbopogon giganteus* and *C. excavatus*. The herb flora includes *Kickxia aegyptiaca* subsp. *virgata*, *Diplophium*

africanum, *Hoslundia opposita*, *Sopubia ramosa* and *Lippia multiflora*.

Setaria pallide-fusca is the dominant grass weed of the arable lands and also for the first two years of fallow, then to be succeeded by *Brachiaria jubata*; both species are able to tolerate a wide range of soil moisture conditions. *Chloris gayana*, *Hyparrhenia poecilotricha*, *H. anthistirioides*, *H. rufa* and *Cymbopogon* sp. are among the later colonizers of the fallow lands. The herbs of both arable and fallow lands include *Acanthospermum hispidum*, *Crotalaria goreënsis*, *C. laburnifolia*, *Galinsoga parviflora*, *Fimbristylis bisumbellatus* and *Commelina imberbis*.

Scattered through the western piedmont are pockets of purplish-brown basalt clays; *Acacia seyal* is usually dominant on such soils, generally in pure stands. *Sporobolus festinus* and *Setaria pallide-fusca* are the dominant grasses at the start of the rains, with the sedge *Pycnus unioloïdes* in the wetter depressions. Other herb and grass associates include *Hibiscus articulatus*, *Habenaria humilior*, *Eragrostis pilosa*, *Eriochloa fatmensis* and *Sporobolus microprotus*. Later in the season *Hyparrhenia* and *Cymbopogon* spp. become dominant.

Where the water table is too high for tree growth, as in the seasonally inundated clay pan near Nyertete, *Panicum subalbidum* and *P. porphyrrhizos* are the dominant clump grasses. Scattered between the widely spaced clumps are the small ferns *Ophioglossum reticulatum*, *O. costatum* and *O. gomezianum* as well as such grasses and herbs as *Tripogon minimus*, *Indigofera hochstetteri*, *Polygala arenaria*, *Habenaria humilior* and *Vigna vexillata*.

In the vicinity of Nyertete there are a number of basalt hills, the remnants of former lava flows. Many of the hill slopes have ancient bench terraces, while on the flat crests there are the ruins of former dwellings. *Anogeissus leiocarpus* is dominant on the hill slopes and usually on the crests as well, often forming a closed canopy; *Boswellia papyrifera* is dominant on the remaining crests. The understorey shrubs include *Azanza garckeana*, *Cordia abyssinica*, *Cadaba farinosa*, *Grewia flavescens*, *G. mollis* and *G. villosa* and with thickets of *Acacia ataxacantha* at the base of the scree slopes.

The grasses tend to be suppressed by the dense undergrowth, although *Setaria barbata* may be abundant in areas of deep shade. Important constituents of the dense herb flora are *Achyranthes aquatica*, *Galium spurium* var. *echinospermum*, *Hoslundia opposita*, *Ampelocissus africana* and *Pavonia patens*. Also present are *Dorstenia walleri*, *Scilla maesta*, *Dipcadi viride*, *Ammocharis tinneana*, *Crinum ornatum* and *Scirpus microcephalus*.

Riparian woodland is found along many of the perennial streams flowing through the piedmont area. In an earlier report (Hunting Technical Services, 1958) the vegetation from the steep banks of basalt boulders was incorrectly referred to as 'gallery forest', despite the fact that the vegetation does not represent an enclave of rain forest species. *Anogeissus leiocarpus*, the dominant tree along the river banks is equally well represented on the piedmont plain. Other associates with the *Anogeissus* are *Khaya senegalensis*, *Ziziphus*

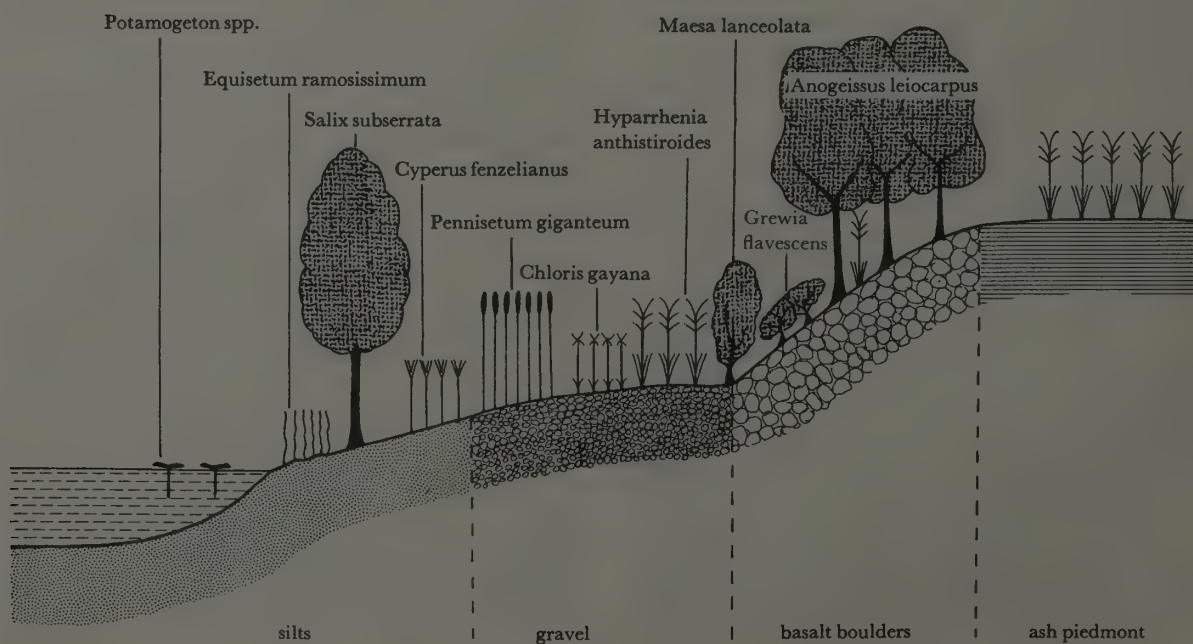
mauritiana, *Z. abyssinica*, *Acacia polyacantha* subsp. *campylacantha*, *A. sieberana* and *Ficus* spp.; *Acacia seyal* may sometimes be locally dominant. At the bottom of the slopes *Acacia ataxacantha* may locally form almost impenetrable thickets; *Grewia flavescens*, *G. villosa*, *G. mollis*, *Maesa lanceolata* and *Combretum molle* are also among the more frequent constituents of the slope bottoms (Fig. 11).

Tufts of *Hyparrhenia anthistirioides*, then a loose mat of *Chloris gayana* with *Cynodon dactylon* and finally tufts of *Pennisetum giganteum* form successive belts from the base of the basalt to just above the flood plain, with *Cyperus fenzelianus* bordering the limit of maximum flood. The more regularly inundated areas are generally free of vegetation during the rainy season but support a few scattered annual grasses and herbs during the dry season. *Salix subserrata*, however, may grow quite close to the water's edge, together with *Equisetum ramosissimum*.

On more open sites where the banks are lower and where there is no protection from fire, *Anogeissus leiocarpus* is absent and is replaced by the aromatic *Otostegia fruticosa*, which forms a low straggly shrubby layer over the basalt boulders, while the sprawling woody Composite *Vernonia richardiana* dominates the slope bottoms (Fig. 12). The grass sequence between the bottom of the basalt boulders and the water's edge is similar to that already described.

Typha domingensis, *Phragmites karka*, *Echinochloa pyramidalis* and *Panicum porphyrrhizos* grow either in the shallow water or just at the water's edge, along with such herbs as *Epilobium hirsutum*, *Ranunculus multifidus*, *Sesbania sesban*, *Mentha longifolia* and the sedges *Cyperus alopecuroides*, *Pycreus mundtii* and *Fimbristylis bisumbellatus*.

Fig. 11 Schematic diagram of riparian vegetation near Nyertete.



Growing in the open water are such aquatic species as *Potamogeton pusillus*, *P. nodosus*, *Nymphaea caerulea* and *Myriophyllum spicatum*, while *Ottelia ulvifolia* shelters amongst the stands of *Phragmites karka*, etc. An interesting aquatic is *Marsilea minuta*, for the typical habit of the terrestrial form tends to be bunched, with rather small leaves, while the aquatic form produces long rhizomes with leaves at intervals; the young rhizomes float and thus raise the leaves above the surface of the water, later the rhizomes sink so that the leaves float on the water.

At both Nyertete and Kalokitting there are large areas of alluvial soils that are cultivated during the dry season. The weed flora of these soils includes *Ammannia auriculata*, *Datura stramonium*, *Drymaria cordata*, *Merremia pterygocaulos*, *Biophytum petersianum*, *Zehneria peneyana*, *Veronica anagallis-aquatica* and *Pennisetum giganteum*. In the summer of 1965 the Nyertete swamp was almost entirely destroyed by exceptionally heavy floods, when the silts were overlain by a thick deposit of gravel.

(II) VEGETATION OF THE MASSIF

Three communities are recognized on the volcanic soils of the massif. They are (a) hill savanna, (b) gallery forest and (c) montane grassland. The gallery forests are too small to be shown on the sketch map (Fig. 8).

(a) Hill Savanna

The very extensive bench terracing on the hill slopes is indicative of man's widespread activity on the massif since historical times. It is doubtful if there is anywhere on the massif that has actually escaped the influence of man, fire and grazing animals, apart from the more inaccessible gallery forests and possibly the higher peaks. *Acacia mellifera* hill thornland occurs on the

drier, eastern slopes of the massif, and merges with the *Anogeissus* hill savanna. Elsewhere on the massif there is a barely discernible transition with increasing altitude from *Anogeissus leiocarpus* as the dominant tree species, through *Terminalia brownii* to *Combretum molle*; this transition is not mappable. Furthermore, the zonation has been so interfered with by man's activities that it has been found more practicable to include all the communities under a blanket 'Anogeissus hill savanna' and describe vegetation of the different geomorphic and soil combinations rather than to attempt to describe the very ill-defined vegetation zones.

Acacia mellifera hill thornland on volcanic soils

This association is found on the drier, eastern ash slopes of the massif and also on the flat-topped basalt hills to the east and north-east of the massif. These hills are the dissected remnants of former lava flows. The rainfall for the area is between 450 and 650 mm, hence a more mesophytic vegetation might have been expected, especially in view of the high water holding capacity of the ash soils compared with the indurated soils of the surrounding basement complex (Hunting Technical Services, 1968).

The bench terraces are still in quite good state of preservation but the soils are just coarse ash clinker, the finer ash particles having been washed away. The soils are therefore quite unsuitable for cultivation today and have long been abandoned. The dominance of *Acacia mellifera* is considered to be the consequence of reduced soil moisture rather than a direct reflection of the rainfall.

This increase in aridity due to accelerated soil erosion is not unknown in the Sudan. The former commercial centre of Darfur used to be at Kobbe, at the southern

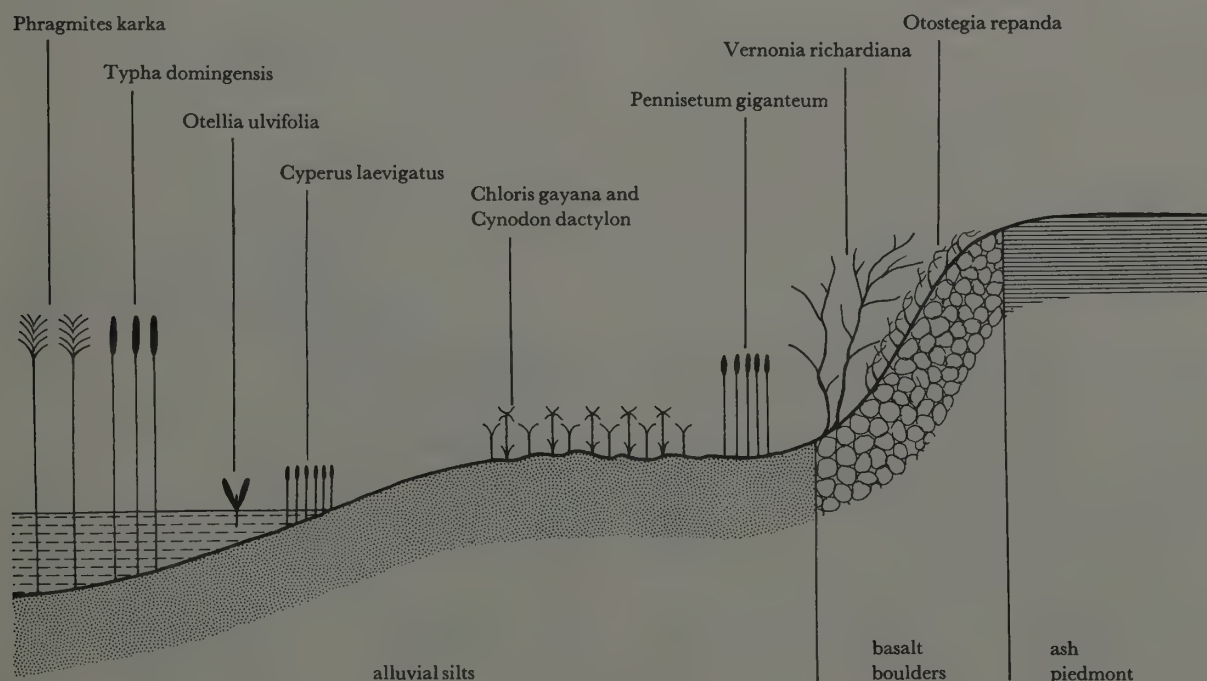
end of the Derb el Arba'in, the great 'Forty Days' road to Egypt; Kobbe lies some 60 km to the north-east of the survey area. At the end of the 18th century the water resources at Kobbe became so depleted that the capital had to be transferred to El Fasher (Arkell, 1961), yet there is no evidence of any significant change in the rainfall pattern for the Sudan (Jackson, 1957) to account for the shortage of potable water at Kobbe. Even within the project area today there are rivers where it is known that perennial flow has ceased within the last few decades and where the reason for this stoppage can be attributed to accelerated sheet erosion.

Acacia mellifera is the dominant shrub of this association, often forming dense impenetrable scrub on the hill slopes. Other, less frequent associates include *Acacia seyal*, *A. nilotica* subsp. *adansonii*, *Commiphora africana*, *Mundulea sericea*, *Euphorbia candelabrum*, *Grewia flavescens* and *Dichrostachys cinerea*. On old fallow lands *Azanza garckeana*, which reproduces vigorously from root suckers, may form quite dense stands; *Acacia seyal*, *Sclerocarya birrea*, *Terminalia brownii* and *Anogeissus leiocarpus* are other typical species of the old fallow lands, and probably represent a transitional stage before dominance by *Acacia mellifera*.

The more important grasses present include *Aristida adscensionis*, *A. rhiniochloa*, *Tetrapogon cenchrifolius*, *Loudetia simplex*, *Tripogon minimus*, *Schizachyrium exile* and *Cymbopogon* spp.

On some of the flat-topped, dissected lava flows, such as Jebel Tia, the very slightly concave cap of reddish-brown basalt clays is dominated by *Sehima ischaemoides*, with *Aristida adscensionis* dominant along the rim (Fig. 13). The clays are almost certainly waterlogged during the rainy season; the *Sehima ischaemoides* here represents an edaphic climax. There is certainly

Fig. 12 Schematic diagram of riparian vegetation near Kibi-Wadi Keira.



no evidence of any previous activity by man on these clays, although the slopes of the lava flows have been extensively terraced and occupied in the past.

Anogeissus hill savanna on volcanic soils

For the reasons already stated, this 'blanket' association will be dealt with under the various geomorphic and soil combinations.

1 ASH LOAMS OF THE LOWER MOUNTAIN SLOPES

Anogeissus leiocarpus is the dominant tree species (Plate 4), although growth is not as well as might be expected in view of the fertile soils and high rainfall; fire or frost could be the limiting factors. Other tree associates include *Ficus sycamorus*, *Cordia abyssinica*, *Sterculia setigera*, *Lonchocarpus laxiflorus*, *Stereospermum kunthianum*, *Khaya senegalensis* and *Albizia malacophylla* var. *ugandensis*. The shrubs include the scandent *Ipomoea verbascoidea* and thickets of *Grewia flavescens*.

Elionurus hirtifolius, although thinly scattered, is very conspicuous during the dry season as it is the only grass growing and flowering at that period. With the start of the rainy season *Sporobolus festinus* dominates the area, giving a purplish-blue hue to the entire ground cover. *Antheophora lynesii* becomes the next major grass to make an appearance, to be followed later in the rainy season by *Hyparrhenia hirta*, *H. filipendula*, *H. anthistirioides*, *Ctenium newtonii*, *Andropogon gayanus* var. *squamulatus*, *Cymbopogon proximus* and *C. giganteus*. The herb flora includes *Kickxia aegyptiaca* subsp. *virgata*, *Diplophium africanum*, *Echinops longifolius* and the very conspicuous subscandent and viscid *Rhynchosia resinosa*.

The epiphytic orchid, *Ansellia gigantea* var. *nilotica* occurs near Golol on *Ficus* spp. and also near Kronga

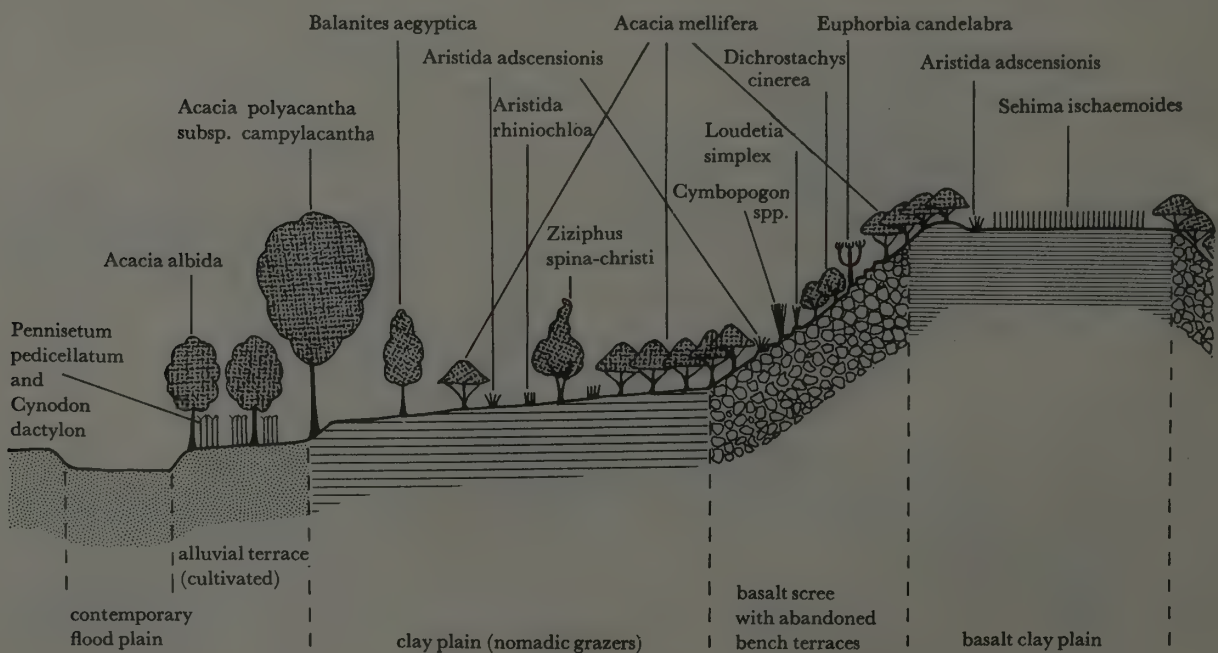
where it grows on *Acacia albida* and *Cordia abyssinica*.

Between Mortagello and Golol there is an area which has been cultivated in the not too distant past and abandoned two decades ago. The topography is of gentle slopes, with low, wide terraces of former cultivation. The trees are sparsely scattered over the area, with denser clumps where the underlying basalt rocks are exposed to the surface. *Combretum glutinosum* is the dominant tree of the old fallow lands, with *Combretum molle*, *Terminalia laxiflora* and *Piliostigma thonningii* also present; all species are typical of fallow lands. The vegetation is considered to represent an early stage in transition to dominance by *Anogeissus leiocarpus*.



Plate 4 *Anogeissus leiocarpus* hill savanna on the ash hill slopes above Kalokitting. In the foreground is a weedy fallow land. The bare trees on the right are *Boswellia papyrifera*.

Fig. 13 Schematic diagram of a transect across Jebel Tia.



On the basalt outcrops *Anogeissus leiocarpus* is the dominant species, forming dense stands, often with an almost closed canopy. Other tree and shrub associates include *Khaya senegalensis*, *Ziziphus mauritiana*, *Z. spinachristi*, *Acacia polyacantha* subsp. *campylacantha*, *A. sieberana*, *A. ataxacantha*, *Gardenia lutea*, *Strychnos innocua*, *Commiphora africana*, *Grewia mollis*, *G. flavescens*, *G. villosa*, *Erythrina signoides*, *Securidaca longepedunculata* and *Pterocarpus lucens*. *Maytenus senegalensis* is also present, usually growing at the base of a larger tree, a situation suggestive of bird dispersal of the seed.

The grasses, in addition to those listed for the ash loams, also include *Setaria barbata*, and *Beckeropsis unisetata* among the dominant species. *Scirpus microcephalus*, *Galium spurium* var. *echinospermum*, *Hoslundia opposita*, *Pavonia patens* and *Craterostigma plantagineum* are important herbs found early in the season; later the herb flora is suppressed by the more vigorous grass species. The curious *Dorstenia walleri*, *Amorphophallus abyssinicus* and *Dioscorea bulbifera* are among the rarer herbs present. A similar vegetation occurs on other basalt and lava exposures elsewhere on the hill slopes.

2 TERRACED MOUNTAIN SOILS

The area has an altitudinal range from 1250 to 3000 m, with a variation in rainfall from 750 (Jawa) to 1000 mm (Golol). The vegetation ranges from regenerated hill woodland on the long abandoned terraced slopes to open scrub in the populated areas.

Anogeissus leiocarpus is the dominant tree throughout the area, although on the drier eastern slopes of the massif more xerophytic species such as *Boswellia papyrifera*, *Acacia seyal*, *A. nilotica* subsp. *adansonii* and *A. mellifera* may become locally dominant. The rainfall would appear to be adequate for the growth of *Anogeissus leiocarpus* in these areas, although the effects of continuous cultivation, cutting of trees for firewood, fire and frost, etc., must have restricted its natural regeneration. The tree is a prolific producer of seed which is both readily and widely dispersed by wind; given the opportunity, natural regeneration should be possible.

Terminalia brownii and *Combretum molle* are other important constituents, especially on the southern slopes above Kalokitting. The very distinctive flat crowned *Acacia sieberana* var. *villosa*, a West African species, is locally abundant above Golol at about 1700 m. Unfortunately the majority of these trees were destroyed when the area was cleared recently for a forestry plantation. At lower altitudes there are what appear to be hybrid forms with the round-crowned var. *sieberana*.

Other minor tree associates include *Sclerocarya birrea*, *Lonchocarpus laxiflorus*, *Khaya senegalensis*, *Stereospermum kunthianum*, *Albizia aylmeri* and *Pterocarpus lucens*, the latter species being generally associated with the higher rainfall areas. *Dalbergia melanoxylon*, *Dichrostachys cinerea*, *Mundulea sericea*, *Dombeya quinqueseta*, *Steganotaenia araliacea*, *Ipomoea verbascoidea* and *Ziziphus* spp. are some of the more frequent shrubs. *Combretum aculeatum* dominates the fallow lands above Kalokitting; *Azanza*

garckeana is a frequent dominant of other fallow lands, and propagates itself by means of root suckers. A density count on a piece of fairly recent fallow land at Suni gave a population density of 13 250 suckers per hectare.

Elionurus hirtifolius is an occasional to frequent grass growing during the dry season. *Sporobolus festivus* is the dominant grass at the start of the rains; *Hyparrhenia anthistirioidea*, *H. hirta*, *H. variabilis*, *H. filipendula*, *H. nyassae*, *Cymbopogon excavatus*, *Andropogon gayanus* var. *squamulatus* and *A. distachyos* are the more important grasses found growing later in the season.

3 BROKEN LAVA PLATEAU SOILS

The vegetation on these soils is very similar to that described for the terraced mountain soils. *Terminalia brownii* and *Combretum molle* are important constituents, especially on the northern and north-eastern slopes.

In areas of poorly drained reddish-brown clays derived from basalt, *Acacia seyal* may be dominant, generally in pure stands, but sometimes in association with *Balanites aegyptiaca* and *Acacia nilotica* subsp. *adansonii*.

At a site examined near Gur Lambang, a seasonally inundated grass swamp was dominated by *Setaria sphacelata* in the wetter areas, with *Sporobolus pyramidalis* and then *Hyparrhenia anthistirioidea* with *Microchloa kunthii* in the progressively drier parts.

In some of the more densely populated and intensively cultivated areas a few scattered *Ficus* spp. may be the only living trees to survive for they are useless for fuel, which is in very short supply.

The grasses are similar to those already enumerated for the terraced mountain soils, with the addition of *Aristida funiculata* and *A. adscensionis*.

4 ASH LOAMS OF STEEP MOUNTAIN SLOPES

The vegetation on these soils is similar to that of the lower mountain slopes except for *Acacia albida* gradually insinuating itself into the flora with increasing altitude. The tree canopy becomes more open with increasing altitude; as the slopes lessen and the density of terraced lands increases, so does *Acacia albida*.

The area lies in a transitional zone between the wooded slopes and the afro-montane vegetation, which occurs at between 1800 and 2000 m, and is recognized by a significant change in the grass species present. At the lower altitudes *Andropogon gayanus*, *Cymbopogon excavatus*, *Hyparrhenia anthistirioidea*, etc., are the major grasses, while at the higher altitudes *Themeda triandra* and *Digitaria diagonalis* var. *hirsuta* begin to take over.

5 ASH BADLANDS

The badlands around Kronga carry a surprisingly heavy human population. It is not known to what degree the very severe erosion in the area can be attributed to man and how much is geological. The soils are highly erodible; footpaths rapidly become drainage channels and wandering cattle dislodge the stones protecting the bench terraces.

Acacia albida, *Cordia abyssinica* and *Ziziphus spina-christi* are the dominant trees, albeit sparsely distributed. *Ficus* spp. may be locally abundant and often supports the epiphytic tree orchid *Ansellia gigantea* var. *nilotica*. Both the *Acacia albida* and *Cordia abyssinica* have been severely mutilated in order to meet the requirements for fuel, and many of the latter species have actually regenerated from stump coppicing. *Anogeissus leiocarpus*, *Terminalia brownii*, *Ficus* spp. and *Euphorbia candelabrum* are among the major constituents of the more inaccessible slopes of the badlands and may be considered as indicative of what the vegetation might have been but for man's activities.

Hypparrhenia hirta, *H. rufa*, *Cymbopogon* sp. and *Heteropogon contortus* were among the more frequent grasses identified during the dry season.

6 NUBIAN SANDSTONE SOILS

Below Suni, at 1300 m, there is an area of Nubian sandstone capped in places by lava. This, plus a small deposit near Garsila in the Wadi Debarei basin, are the sole remnants of a former extensive sheet of Nubian sandstone within the survey area.

The soils are shallow and very stony; in places they have been stripped to the parent material. *Acacia mellifera* is the dominant shrub, with *Dichrostachys cinerea*, locally abundant. *Commiphora schimperi*, *Cadaba farinosa*, *Euphorbia candelabrum*, *Grewia flavescens*, *Boscia senegalensis*, *Albizia amara* subsp. *sericocephala*, *Balanites aegyptiaca* and *Terminalia brownii* are other minor associates. *Aristida rhinoclhoa*, *Schizachyrium* sp. and *Tetrapogon cenchrifolius* are the main grasses present, and very thinly scattered. Among the few herbs seen were *Vernonia perrottetii* and *Pegolettia senegalensis*. The alluvial soils in the valley of the Wadi Jawa, which flows through the Nubian sandstone are intensively cultivated; this valley is one of the few sites where *Adansonia digitata* has been observed within the survey area.

(b) Gallery Forest

The term 'gallery forest' was first used by the Italian trader and explorer Carlo Piaggia (Antinori, 1868) to describe a form of riverine vegetation on the Sudan-Congo borders.⁽¹⁾ Schweinfurth (1868) gives detailed descriptions of the gallery forests, with due acknowledgement to Piaggia. They are enclaves of a predominantly more equatorial vegetation that has penetrated into the drier areas along the river valleys. Such valleys are characteristically so deeply etched

that the tops of the tallest trees of the gallery do not appear above the level of the surrounding plain. Harrison & Jackson (1958) refer to them as 'reduced forms of rain-forest confined to the vicinity of streams'.

By contrast, riparian woodland, fringing forest or fringing woodland contain species that are representative of the surrounding vegetation or are relics of that vegetation before being despoiled by the activities of man and his grazing animals. Tree growth, as might be expected, will be more luxuriant due to more favourable moisture conditions and some protection from fire, but there will be no suggestion of a major proportion of the vegetation being representative of a more favourable climate in the past, although occasional species may be present that will indicate that such changes have taken place. Such riparian vegetation must, and does, intergrade with the gallery forests.

There are several true gallery forests on the south-western slopes of the Jebel Marra massif; several were observed from the air but only three were visited. Unfortunately for the purposes of this present study, these extremely interesting habitats were not studied in great detail since such an investigation would have been well outside the terms of reference for the ecological survey, which was primarily directed towards determining the agricultural potential of the area.

The largest gallery forest is at Saur, above Golol, and extends for several kilometres. The main body of the forest lies in a deep precipitous-sided gorge into which access is impossible without ropes; both the upper and lower extremities are protected by virtually impassable waterfalls. It is possible to obtain relatively easy access to a small portion of the forest at Saur, above the upper waterfall ('Saur' is the Fur word for 'waterfall').

There is an abrupt change in the vegetation from open *Anogeissus* hill savanna to the closed canopy of the gallery forest in the valley bottom. *Anogeissus leiocarpus*, *Combretum molle* and *Entada abyssinica* frequently occur along the forest margin. The main constituent of the forest is *Trema orientalis*; the nearest known locality for this characteristic species of secondary forest (Richards, 1952) is from Yalinga in the Central African Republic, 700 km to the south. *Syzygium guineense* and *Polyscias fulva*, both species from the southern provinces, are frequent associates. *Jasminum dichotomum*, *Teclea nobilis* and *Albizia zygia* are also present as well as *Casearia barteri*, a Guineo-Congo rain-forest species not previously recorded for the Sudan, whose nearest known locality is also Yalinga. *Rhoicissus revoli*, *R. tridentata*, *Dregea abyssinica* and *Clematis* sp. are among lianes present. Bordering the streams, where the vegetation is more open, are scattered such shrubs as *Maesa lanceolata*, *Rhus vulgaris* and *Carissa edulis*. Ferns are also plentiful along the stream banks and in shady, moist places; these include *Thelypteris quadrangularis*, *Pteris dentata*, *P. vittata*, *Adiantum capillus-veneris* and *Asplenium aethiopicum*.

The prostrate *Oplismenus hirtellus* is the dominant grass, with frequent tufts of *Setaria plicatilis* in the more

(1) 'Lungo queste acque crescono famiglie innumerevoli di piante che per le spesse ombre che gettano in basso il Piaggia chiama gallerie.

Egli descrive queste gallerie con particolari minutissimi, i quali ti fan risovenire gli ombrosi e incantati viali o meglio laberinti che i poeti descrissero nei giardini delle fate.'

(Along these waters grow innumerable families of plants which because of the thick shade which they cast below Piaggia calls gallerie.

He describes these galleries in minute detail, which makes you recall the shady and enchanted ways, or better, labyrinths, which the poets would have likened to the gardens of the fairies.)

shady places. *Cynodon dactylon* occurs on the alluvial soils bordering the stream.

Due to its inaccessibility, the main body of the gallery forest is likely to remain completely undisturbed by man; the accessible upper portion has recently been opened up in order to provide a suitable site for a forestry nursery. Even so there is sufficient of interest to suggest that further exploration of the main gallery forest could be very interesting indeed.

To the east of Saur, in the next valley, there is a minor gallery forest where *Anogeissus leiocarpus* forms a closed canopy, and with a thick layer of humus carpeting the ground. This is the only site where I have found such a well defined humus layer. Local concentrations of humus are fairly common within gallery forests; by contrast, fringing woodlands may have a carpet of dry leaves without humification and are frequently, although perhaps not annually, swept by fire – there is no evidence of fire in any of the gallery forests.

Masses of the small, purple flowered orchid *Disperis anthoceros* grow on the humus. This is a new record and the only known locality for this forest species so far recorded for the Sudan. The endemic *Plectranthus jebel-marrae* was also found in this locality.



Plate 5 The gallery forest at Mortagello with *Phoenix reclinata* beside the pool.

The third gallery forest is at Mortagello, by the Forest Department's Rest House (Plate 5). The forest is in a deep basalt gorge, protected upstream by a waterfall but merging downstream into riparian woodland where the gorge widens into a v-shaped valley. *Combretum molle*, *Lannea kerstingii* and *Anogeissus leiocarpus* border the gorge rim. *Syzygium guineense*, *Diospyros mespiliformis* and *Phoenix reclinata* are the major tree constituents, with an occasional *Adina microcephala* also present. According to Harrison & Jackson (1958), single lines of *Syzygium guineense* are representative of the drier limits of gallery forests in the southern Sudan.

Paullina pinnata and *Saba florida* are characteristic lianes, with *Maytenus buchananii*, *Embelia* sp. and *Desmodium salicifolium* among the shrubs present.

Microchloa kunthii, *Rhynchelytrum villosum* and *Mariscus alternifolius* are among the more frequent grasses and sedges occupying the soil pockets between the basalt boulders. *Biophytum abyssinicum*, *Lindernia nummularifolia*, *Kalanchoë lanceolata*, *Canscora diffusa*, *Cyphostemma adenocaula*, *Chlorophytum schweinfurthii* and *Haemanthus multiflorus* are among the numerous herbs present.

The ferns are particularly prevalent and include *Anogramma leptophylla*, *Asplenium pumilum* subsp. *hymenophylloides*, *Adiantum phillipense*, *Thelypteris dentata* and *T. gueinziana* in the moister areas, with *Actiniopteris semiflabellata*, *Cheilanthes farinosa* and *C. anceps* in the drier crevices of the columnar basalt of the gorge sides. The latter species is particularly interesting for it is the only record of this Asian species in Africa apart from one other record from Northern Nigeria.

Sansevieria liberica, a West African species, dominates the sloping upper rim of the gorge, above the vertical columnar basalt sides. Here the tree canopy becomes more open, and there is some slight danger from fire.

(c) Montane Grassland

The transition from hill tree savanna to montane grassland takes place between 1800 and 2000 m, on the flanks of the massif before reaching the rolling plains and lava peaks of the upland plateau. An interesting feature of this upland area is the apparent absence of any altitudinal zoning of the vegetation, also observed by Bruneau de Miré (1960), who writes 'La limite inférieure de l'étage culminant se situe vers 2000 m d'altitude environ. De composition homogène, la végétation de cette zone varie peu en fonction de l'altitude et apparaît d'un seul bloc au-dessus des derniers boisements de type tropical'.

Several visits were made to this upland area and it was noticeable that the herb and grass flora did not appear to show any pre-rains or early-rains aspect such as occurs in the lowlands. There was, however, a definite time-lag in maturity associated with increasing altitude. It was estimated that an increase in altitude of 300 m produces a delay of approximately three weeks in floral development.

Today the plateau is sparsely inhabited; cultivation is almost entirely restricted to the valleys and livestock consists of small herds of sheep and goats. In the past cultivation has been more widely practiced. Abandoned terraces for dryland cultivation can be found up to 2750 m. Large paddocks of several acres in extent and bounded by dry-stone walls suggest that perhaps cattle might have been carried in the past, possibly during the Mahdist period when the lowland Fur from the surrounding plain fled to the safety of the massif.

The consequences of man's occupation of the massif over the last 2000 years has resulted in almost all the area having been terraced and cultivated, possibly by a system of shifting cultivation, much as is practiced by the Hill Fur of today. Over such a period it is

inevitable that the trees would have been destroyed for either firewood or building timber. This can be seen happening today around the villages in the hill savanna zone on the slopes of the massif.

Apart from a few secluded valleys there are few areas which are not swept annually by fire. In addition quite intensive soil erosion is also taking place. The destruction of the surface vegetation by fire and the lack of repairs to the abandoned terraced slopes are the main reasons for the acceleration in erosion, the consequences of which are a progressive silting up of the rivers in the plains below, resulting in a retreat of the perennial streams.

Badland topography is a feature of the south-western slopes, with gullies only a metre wide yet 50 m or more deep. In the gently rolling plains of the plateau it is quite usual to find *Olea laperrinei* growing on mounds several metres high, the soil below having been protected by the spreading root system (Fig. 14). In one site a young *Olea* sapling of only a few centimetres diameter had half its root system exposed for a depth of over 2 m. The root system in this case was poorly developed with very few laterals, but it does give some idea of the rapidity with which soil erosion is taking place today.

Two distinct communities are recognized in this afro-montane grassland zone: upland grassland and upland meadow. The former is characterized by bunch grasses and shrubby herbs forming an open community, whereas in the latter the grasses form an even, closed sward.

Upland Grassland

This occurs on the steeper slopes and eroded lands and is very much the larger of the two communities.

Andropogon distachyos is the dominant grass throughout the community. *Themeda triandra* and *Hyparrhenia hirta* are the more frequent associated grasses.

Lavandula pubescens and *Blaeria spicata* subsp. *spicata* are the two commonest shrubby herbs, albeit sparsely scattered. *Kickxia aegyptiaca* subsp. *virgata*, *Felicia dentata* subsp. *nubica* and *Campanula edulis* are among the occasional perennial herbs present.

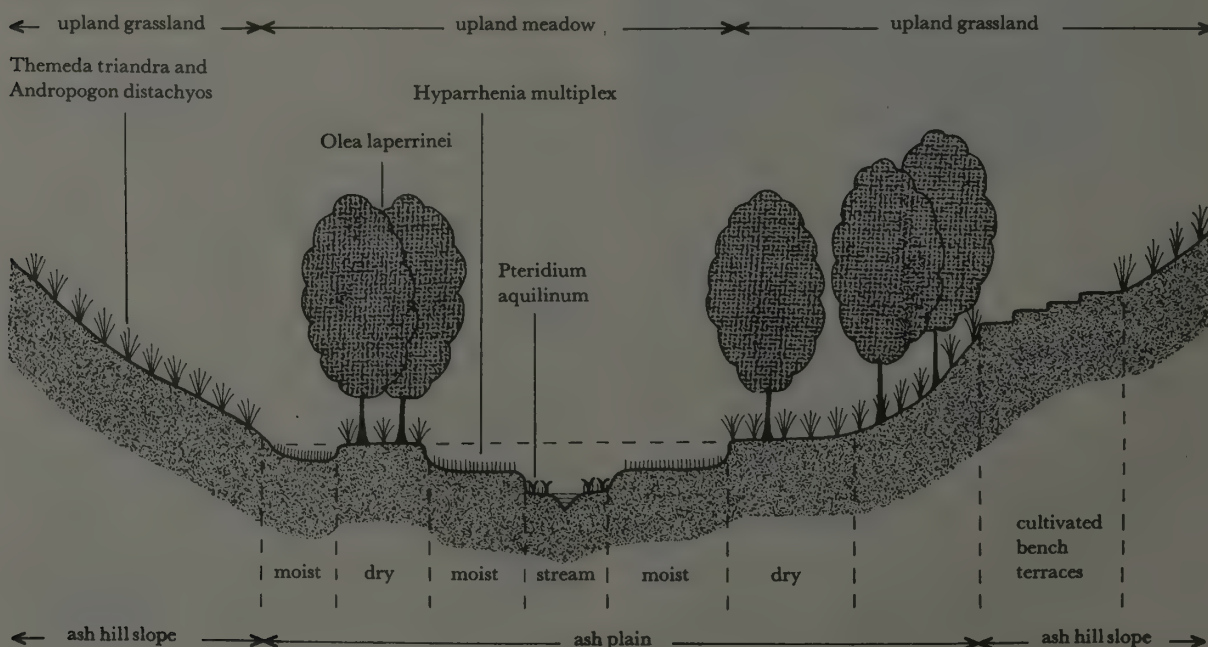
Upland Meadow

The flatter ash plains tend to be semi-waterlogged during the rainy season and resemble an alpine meadow in appearance during the rains. The short sward of golden-headed *Hyparrhenia multiplex* is brilliantly studied with the reddish-purple flowers of *Geranium ocellatum* and *Erodium malacoïdes*, the electric-blue of *Cyanotis barbata* and the woolly white capitula of *Gnaphalium marranum*. The rather dull, brownish-flowered orchids *Habenaria humilior* and *Satyrium coriophoroïdes* and the green-flowered *Habenaria filicornis* are widely distributed throughout the community. Bracken, *Pteridium aquilinum*, may dominate quite large areas, especially on the flood-plains of the more deeply entrenched perennial streams.

On the better drained sites of the gently rolling ash plains, the short, yet dense, 5 cm high turf is composed of locally dominant patches of *Hyparrhenia multiplex*, *Tripogon montanus* and *Vulpia bromoïdes*, with *Aristida congesta*, *Festuca abyssinica*, *Panicum pusillum*, *Tripogon leptophyllus* and *Pentaschistis pictigluma* also present. The herbs present include *Swertia abyssinica*, *Gnaphalium marranum*, *Campanula edulis*, *Geranium ocellatum* and *Cyanotis barbata*. The 2 m high *Ferula communis* appears absurdly gigantic in this short herbage (Plate 6).

Olea laperrinei and *Acacia albida* are thinly scattered

Fig. 14 Schematic diagram of a transect across a valley between the mountain slopes to the north of Deriba.



throughout the two grassland communities, although in a few sites either may occur as pure stands. *Olea laperrinei* has a lower altitudinal limit of approximately 2300 m, while the upper limit is close to 3000 m, where it appeared to be restricted more by the lack of soil on the lava peaks than by the altitude.

The olive is extremely tough and fire resistant and capable of regenerating from stem suckers when damaged. Two life forms were observed; the juvenile form is that of a cushion-shrub with smaller, sessile leaves and apparently readily browsed by stock. The mature form is that of a graceful tree closely resembling that of *Olea europaea*, the leaves of which do not appear to be browsed by stock. Some trees are regarded as sacred, a notable specimen being that at Tora Tonga (Plate 7) which is visible on the skyline from Kalokitting, 20 km away. The trees are very slow growing and reach a height of 12 m or more, with a diameter of over 2 m. According to the estimates of Professor Quézel (1962), such trees would be from two to three thousand years old. The better grown specimens tend to border the perennial streams, rather as the willow in Britain: it is quite evenly distributed over the plains as well as the hill slopes (Plate 8), although at the higher altitudes it tends to concentrate in the deep gullies, often with *Ficus palmata*. The latter species is often reduced to a multi-stemmed shrub in the vicinity of villages due to constant cutting.

Acacia albida generally occurs on the flatter slopes and ash plains, with an upper altitudinal limit of approximately 2500 m. Unlike the olive, *Acacia albida* is not restricted to the massif and was probably introduced onto the massif by grazing cattle, for its distribution approximated to the natural grazing areas and to areas within the dry-stone walled paddocks. The species



Plate 7 The sacred olive tree (*Olea laperrinei*) at Tora Tonga. This tree is clearly visible from Kalokitting, 20 km away.

appears to be regenerating naturally even at this altitude.

Among the numerous weeds of cultivation are *Bromus pectinatus*, *Vulpia bromoides*, *Festuca abyssinica*, *Themeda triandra*, *Harpachne schimperi* and *Snowdenia polystachya* as the more frequent grasses, while the more interesting herbs include *Galium thunbergianum*, *Gernium ocellatum*, *Capsella bursa-pastoris*, *Malva verticillata*, *Senecio hochstetteri* and *Chenopodium murale*.

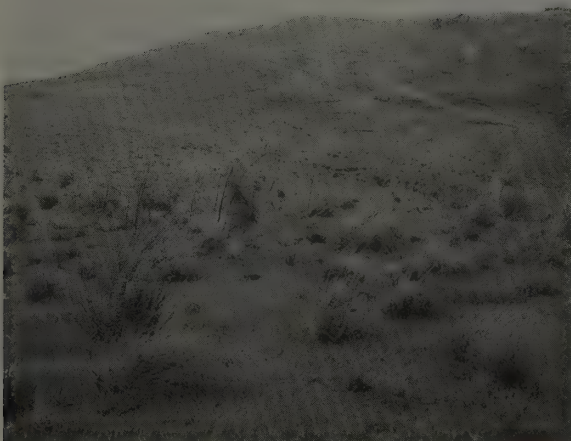
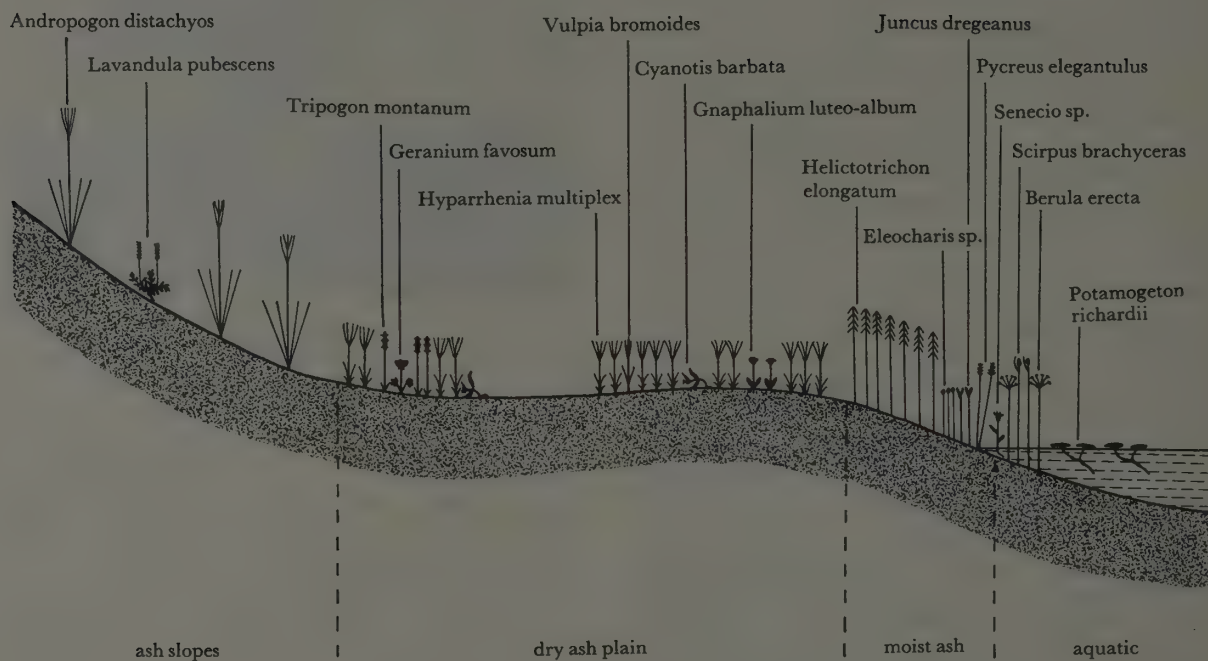


Plate 6 Upland grassland at 3000 m. The short turf consists of *Tripogon montanus*, *Vulpia bromoides* and *Hyparrhenia multiplex*, with occasional tufts of *Andropogon distachyos*. The tall herb is *Ferula communis*.



Plate 8 *Olea laperrinei* growing at the base of a tuff cliff, above Suni at 2500 m.

Fig. 15 Schematic diagram of the distribution of herb and grass species at Tereng, 2 450 m.



In moist soils bordering the perennial streams *Helictotrichon elongatum* may become the dominant grass, with *Eleocharis sp.*, *Juncus dregeanus* and *Pycnus elegantulus* in progressively moister sites. *Berula erecta* and *Potamogeton nodosus* are frequent aquatic herbs (Fig. 15).

Laurembergia tetrandra subsp. *brachypoda* was seen to form a dense mat in a marshy site by the perennial stream at Tereng, with *Alectra sessiliflora* also present. Wet moss sponges containing *Drepanocladus* and *Bryum* spp. also occur at these altitudes (2150 m).

Chapter 8

Introduction to phytogeography

The history and development of phytogeography is briefly surveyed by Schnell (1970–71), a short summary of which is given here.

The early beginnings (if we disregard the ancient Greeks), are to be found in the distributional data presented in the local floras of Linnaeus (1737, 1755), Gmelin (1747–69), Aublet (1775), etc. It was not until the start of the 19th century that phytogeography became a separate discipline of botany, as we understand it today.

The works of the talented Prussian scientist and explorer, Alexander von Humboldt (1805, 1807, 1815, 1816) led to him being regarded as the founder of modern phytogeography. Other important contributions were made at this time by Robert Brown (Ray Society, 1866), A. P. de Candolle (1820, 1828–38), A. de Candolle (1855), Schouw (1823) and Meyen (1836).

The birth of this new discipline is to be associated with the awakening interest in the botanical exploration of hitherto unknown parts of the world. Humboldt, Bonpland, Martius and Saint Hilaire went to America, Jacquemont explored India and the Himalayas, while the exploration of the islands of the Pacific and Indian Oceans was undertaken by La Billardiére, Ventenat, Bory de Saint-Vincent, Dumont d'Urville, etc., and George Don, Heudelot, Vogel, Thonning, Kotschy, etc., collected in Africa.⁽¹⁾

The realization of the importance of Darwin's theory of evolution gave rise to what Good (1947) terms the 'Darwinian Period in phytogeography' for the years 1850–75. There were important contributions by both Darwin and Hooker during this period. The latter's work is ably presented by Turrill (1953).

The remainder of the 19th century is what Good terms the 'German Period' with the classical works of Grisebach, Drude, Engler and Schimper. With the rise of interest in ecology and genetics during the beginning of the present century phytogeography suffered a partial eclipse. In recent years there has been a welcomed tendency towards a more multi-disciplined approach to the subject by Croizat (1952, 1958, 1962), Walter (1964–68), Schnell (1970–71) and Zohary (1973). White (1971), in a stimulating paper, has attempted to define the principles underlying modern phytogeography, as well as pointing out some of the mis-

conceptions. It is hoped that these works will lead to an even greater interest in phytogeography.

Phytogeography is a branch of botany that has been sadly neglected by English speaking botanists; there is still no adequate treatment of the subject in English, consequently it is necessary to define some of the terms and concepts.

An examination of the literature reveals the use of three more or less synonymous terms: geobotany, plant geography and phytogeography. These terms have been used by different authors with different shades of meaning in order to stress their particular approach to plant distribution on a global scale (see Wulff, 1950). Wulff has shown how geobotany has changed from being a general term covering all aspects of plant distribution on a geographical basis, to one indicating the relationships between soil and vegetation. Plant geography has also been used as a general term; sometimes it has been used in a restricted sense which has been clarified by such prefixes as 'ecological' or 'historical', in other cases such prefixes have not been used. It is an ambiguous term, although readily capable of clarification, provided the appropriate prefix is added. The third term, phytogeography seems to have been fairly consistently used in the broadest sense, and is consequently considered the most appropriate term to use. It should be pointed out that the various branches or aspects of phytogeography cannot be placed in well defined compartments, each aspect is dependent upon the remainder, as well as on allied branches of botany.

Good (1964) has defined phytogeography as 'that branch of botany that deals with the spatial relationships of plants both in the present and the past'. There is, however, no clear demarcation between phytogeography and ecology, some overlap is inevitable. In an attempt to clarify the fundamental differences between the two it must be remembered that the common pool of plants present within a phytogeographical area is governed by the broad climatic belts of the world. Phytogeography is concerned with the changes in the floristics of the common pool resulting from historical factors. Ecology, however, is concerned with the segregation of species within the common pool due to environmental factors.

It follows that there will be a direct correlation between the broad regional ecological divisions, such as the thorn savannas of Africa south of the Sahara, and the corresponding phytogeographical division, which in this particular example, are Sahelian and Afrioriental Domains (see Clayton & Hepper (1974)

(1) See *Comptes rendus de la IV^e réunion plénière de l'association pour l'étude taxonomique de la flore d'Afrique tropicale*. Junta invest. ultramar, Lisbon 1962, for accounts of the botanical exploration of tropical and southern Africa.

for further discussion). Ahti *et al.* (1968) write '... the essential aim of distinguishing vegetation regions is to arrive at an ecologically sound geographic classification which should reflect the behaviour of most of the plant species and their communities as closely as possible'.

Ahti *et al.* have also suggested that the majority of phytogeographical studies can be classified as belonging to one of three categories: bioclimatic, edaphic-topographic or floristic.

The bioclimatic approach is useful for delimiting the broad climatic zones of the world, e.g. Arctic, Boreal, Temperate Zones, etc. (Fig. 16). On a smaller scale, the floristic regions can also be roughly defined from climatic data (Fig. 17); an invaluable source of such data can be obtained from Walter & Lieth (1960). Climatic data alone, however, cannot be used for determining the smaller phytogeographical units; other factors must be considered and the climatic data adjusted accordingly. Smith (1949), working in the Sudan, has effectively demonstrated that there is a very strong correlation between the distribution of plant species, rainfall and soil texture, and that it is possible to predict one factor from the presence of the other two. Due to the poor moisture infiltration and the high moisture retention properties of clay soils, the tree species present on such soils may also be found under conditions of lower rainfall on sandy soils, which have good infiltration properties and readily available moisture. The herb stratum, however, is more responsive to local edaphic and microclimatic variations, which are more difficult to demonstrate on the zonal scale postulated by Smith.

A bioclimatic approach, however, is very useful for interpreting plant distribution from fossil evidence and has been used by Coetzee (1967) for the East African montane flora.

The edaphic-topographic approach is fundamentally an ecological classification. Climatic conditions often receive too little attention, although often these can be of considerable importance, as can be seen from Smith's studies mentioned above.

Boughey (1965), with special reference to montane vegetation, has pointed out that ecological similarities do not necessarily imply floristic similarities. This is equally applicable to lowland communities.

The floristic approach relies on the distribution pattern of many, or sometimes, few species. In the interpretation of the pattern, notice must be taken of the effect of both historical and ecological factors. Dot maps are a very effective way of portraying distribution and have the great advantage of showing the extent of the data available (Stearn, 1951). The pattern of the dots can usually be best interpreted from their intensity rather than the extent of their distribution (Webb, 1965; Ahti *et al.*, 1968). There is a danger that common species may be under-collected because they are so well known, e.g. *Adansonia digitata* (Lucas, 1971).

Walters (1951) suggests that the aim of phytogeography is to explain the distribution of plants in

terms of the environment in its widest sense, both past and present, as well as in terms of the genetic capacity of the plants themselves. Plant distributions, in order that they may be studied, need to be classified; for this purpose a specialized terminology has been evolved. Rather surprisingly there appears to be no modern textbook in English that defines such terminology and the concepts governing the hierarchical classification of the world's flora on a phytogeographical basis.

The following four general principles have been adopted from the concepts of Eig (1931) and Walters (1951) and govern the thoughts behind the development of phytogeography as a branch of botany:

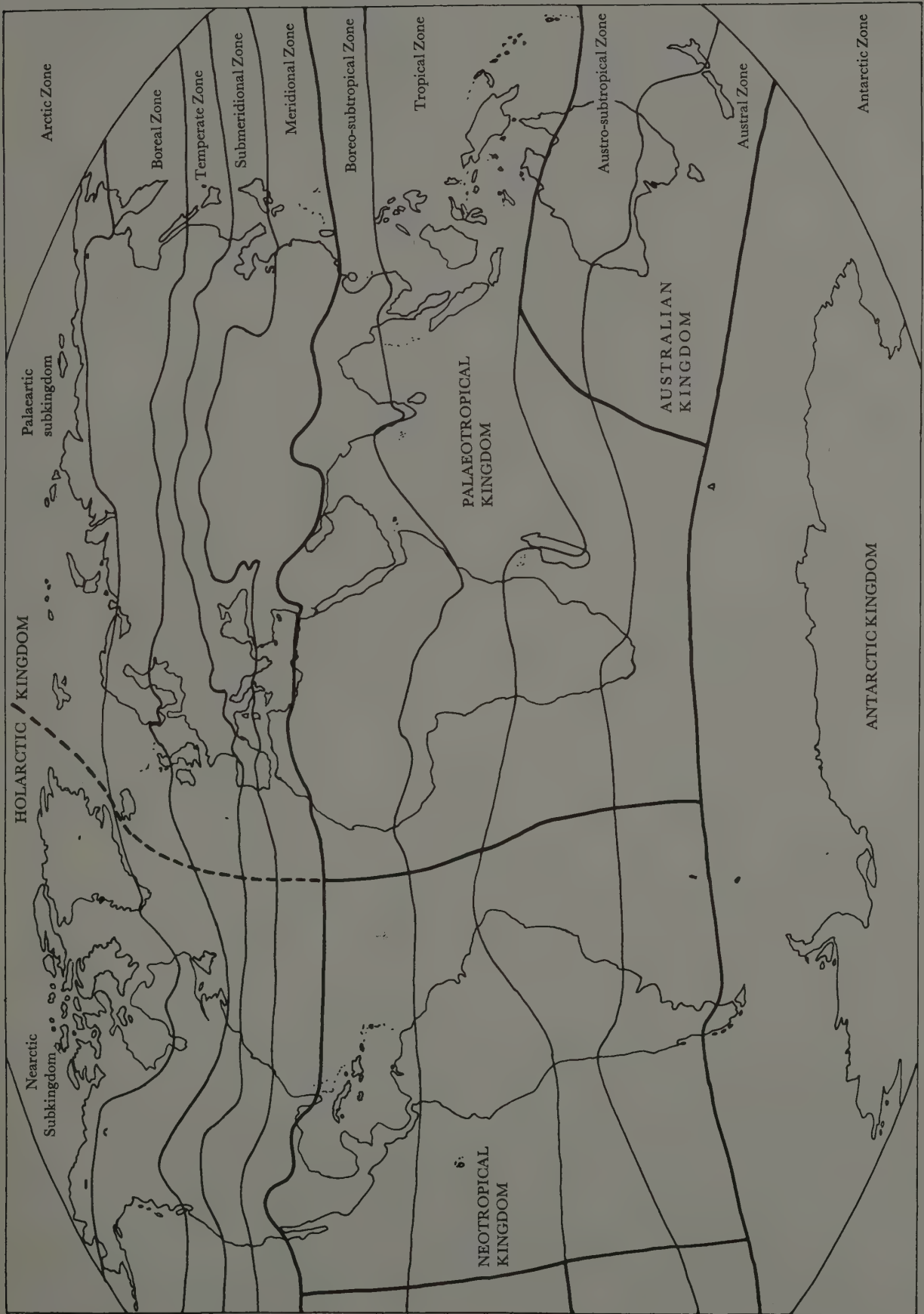
- 1 The climate, in its widest sense, is the primary factor controlling plant distribution. The soil, although important, is subsidiary.
- 2 The effect of climatic and geomorphic changes in the past have had a profound effect upon plant distribution.
- 3 The range of every taxon is limited by an inherited and definite tolerance to the environment.
- 4 Species are not static, they respond to changes in the environment by either migrating (within the limits imposed by transport agencies), or by becoming extinct, or by adapting themselves to the change.

An elaboration of these four principles can be found in Cain (1944).

The kingdom (or empire) is the largest floristic category recognized and is mainly delimited by the broad climatic belts of the world such as the arctic, temperate, etc. Floristically the kingdom is characterized by the presence or absence of the larger taxonomic groups, such as families, tribes, or even the larger genera. The following five kingdoms are recognized: Holarctic, subdivided into the Palaearctic and Nearctic sub-Kingdoms; Palaeotropical; Neotropical; Australian and Antarctic (Fig. 16). Following recent practice, the Cape is treated as part of the Palaeotropical Kingdom, despite its strong affinities with the Australian and Neotropical Kingdoms and its own highly endemic flora. Whether kept as a separate kingdom or included in the Palaeotropical Kingdom, the position of the Cape flora is not entirely satisfactory. The floristic constituents of the various kingdoms are discussed by Good (1964) and Takhtajan (1969); the various floras represented largely reflect the degree of independent development associated with the breaking up of Gondwanaland, etc.

The region is regarded by Eig (1933) as the fundamental unit within the hierarchy, since it demonstrates the natural relationship between the flora and the vegetation in terms of time and space. A region may be regarded as a geographical entity determined by seasonal climatic factors such as the duration of the rainy season and whether the rains occur in summer or winter, etc. Within this geographical entity there will be a large number of endemics at both specific and generic levels, and sometimes even families. The region tends to be an area of speciation for certain

Fig. 16 Floristic kingdoms and zones of the world.



groups of taxa or is marked by certain floristic-historic events.

A region may exist as a single area, or be discontinuous, as with the recent concept of an Afro-montane Region by White (1965). Although a region may be characterized by certain physiognomic types of vegetation, the reverse is not necessarily true.

The domain is a natural floristic, physiognomic and climatic subdivision of a region. The Sahelian, Afro-oriental, Sudanian and Zambezian Domains of the Sudano-Zambezian Region are an excellent example of such subdivision (Fig. 18).

Lower categories such as sector and district can be used but they are considered to have very limited use for the study of an imperfectly known flora such as that of the African continent. For the present their use in Africa should perhaps be limited to describing the distribution of a family or a genus by a monographer, where the more subtle differences of taxonomic and phytogeographical distinctions can be better demonstrated.

An enclave, as defined by Eig (1933) is a limited areal unit possessing special ecological conditions within a region, yet colonized by plants from another region. Such enclaves are generally accepted as representing a relic flora left behind from a former expansion of their parent region.

An element consists of a group of taxa belonging to a particular region or domain. It is a term that has been given various shades of interpretation, such as a 'tertiary element', 'ruderal element', 'genetic element', etc. These various interpretations are discussed by

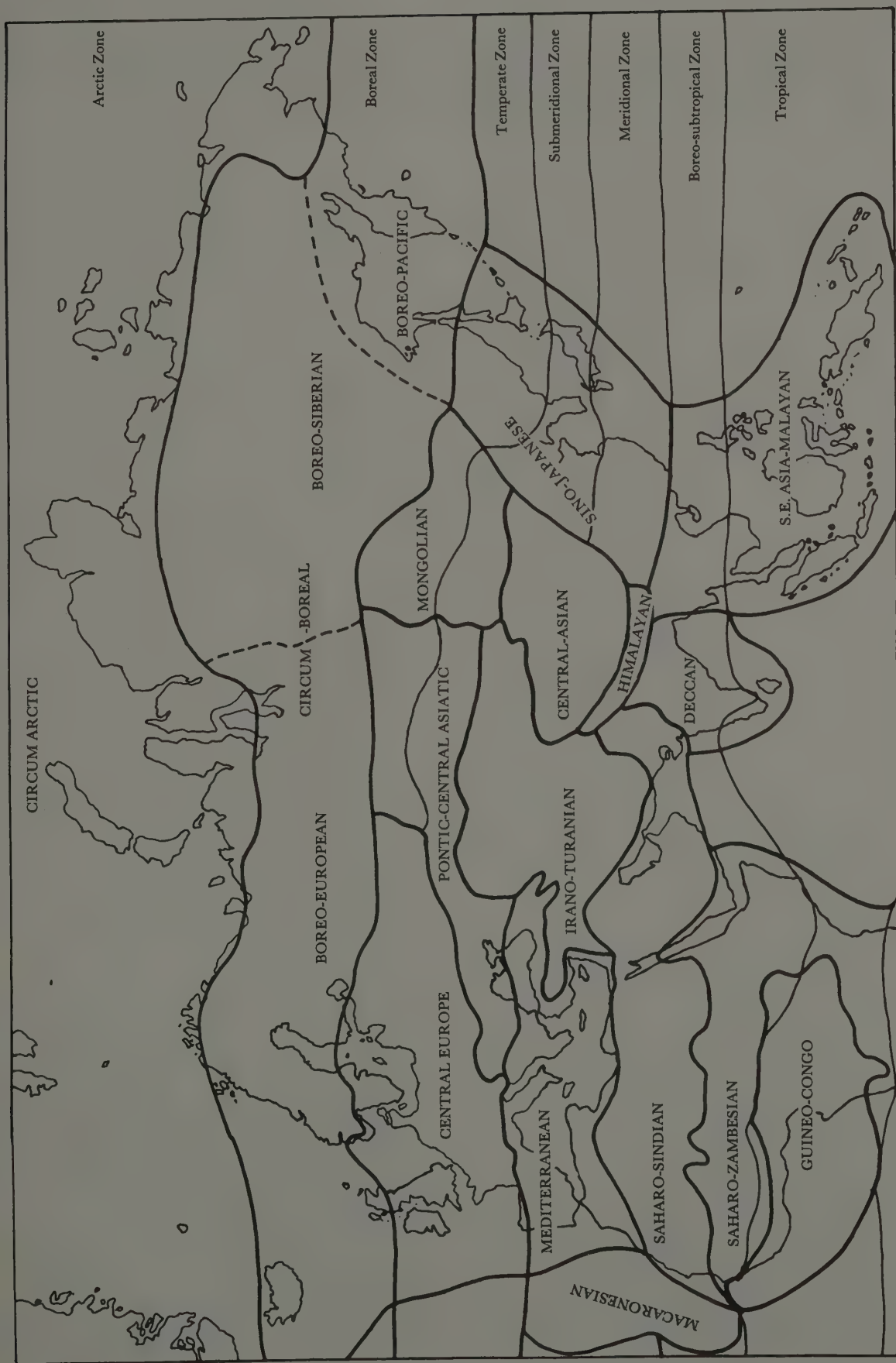
Liben (1962). An element has consequently become a term that should never be used without qualification.

The original meaning, quoted by Cain (1944) from a definition by Braun-Blanquet is that of a phytogeographical element, which is defined as 'the floristic and phytosociologic expression of a territory of limited extent; it includes the taxonomic units and the phytogeographic groups characteristic of a given region'.

Genetic elements are delimited by the supposed area of origin of each taxon; they are a useful means of expressing the supposed area of origin of floras with a high percentage of endemism, such as the Afro-alpine flora of the East African mountains (81 percent of the taxa are endemic according to Hedberg (1961, 1965)). The affinities of such floras are difficult to express in terms of phytogeographic elements.

In a general review of phytogeographic terminology, Holub & Jirásek (1967) have suggested that the term 'endemic' should only be used for taxa of autochthonous origin and must not be confused with taxa having a limited distribution due to a reduction in their former area of distribution, i.e. relic taxa. They suggest that the term *refugium* should be used for a taxon surviving in a region where it is believed to belong, and *residium* should be used for a taxon that belongs to another region and has been left behind following some historical event such as a change of climate.

This is undoubtedly a desirable concept, although often difficult to apply. For the purposes of this thesis 'endemic' is used in the broad sense since the relationships of many of the Jebel Marra taxa are still imperfectly understood.



Chapter 9

The phytogeographical divisions of Africa and of neighbouring Regions

It is neither practical nor possible in this present study to survey the history and development of African phytogeography. Readers requiring further reading are advised to consult the excellent bibliography of Monod (1957).

For the purposes of this study I have accepted as a general framework, the floristic kingdoms and zones of Meusel *et al.* (1965), except that I have followed recent practice of other African phytogeographers in not recognizing the Cape Kingdom (Fig. 16). I have also accepted Meusel's floristic regions for Euro-Asia (Fig. 17) but have followed White (1965) and Chapman & White (1970), with minor amendments, for Africa (Fig. 18). The adjustments to White's boundaries are the result of a careful examination of the distribution maps of a number of characteristic species for a region or domain. The majority of the maps have been especially prepared for this present study (and can be found at the end of this volume).

Early on in this study it was evident that the regions and domains acknowledged within the African continent were poorly described. A search through the literature has failed to reveal any recent attempt to define adequately in writing what is exactly meant, for example, by the Sahelian Domain (Chevalier, 1900) or the Afromontane Region; a valuable and concise but rather too general account is given in Takhtajan (1969). The regions and domains recognized for tropical and subtropical Africa are as follows:

- 1 Sudano-Zambezian Region
 - a. Sudanian Domain
 - b. Afrioriental Domain
 - c. Sahelian Domain
 - d. South Arabian Domain
 - e. Zambezian Domain
- 2 Guineo-Congo Region
 - a. Guinea Domain
 - b. Congo Domain
 - c. Usambara-Zululand Domain
- 3 Afro-montane Region
- 4 Afro-alpine Region
- 5 Cape Region
- 6 Karroo Namib Region
- 7 Saharo-Sindian Region
 - a. Western Saharo-Sindian Subregion
 - b. Middle Saharo-Sindian Subregion
 - c. Eastern Saharo-Sindian Subregion

All these regions and domains are now described, also included are the Mediterranean Region (8) and

the Irano-Turanian Region (9), which are of particular interest to this present study. The different climatic regimes within these subdivisions are illustrated by means of climatic diagrams (Fig. 19).

1 Sudano-Zambezian Region

This region corresponds to the largest ecological formation in Africa, the tropical savanna. To the north it is bounded by the deserts and semi-deserts of the Saharo-Sindian Region, in the centre it circumscribes the forests of the Guineo-Congo Region, while in the south it extends to the deserts and semi-deserts of the Karroo Namib Region and the macchia of the Cape Region.

An extension of the Sudano-Zambezian Region into western and southern Arabia has been suggested by Lebrun (1947), Monod (1957) and others; its boundaries and precise status have not yet been satisfactorily determined, since the flora and ecology of the area are, as yet, imperfectly known.

The regional climate is one of hot dry seasons alternating with cooler rainy seasons; in parts of both East and West Africa there are two rainy seasons per annum, but for the greater part of the region there is a single and relatively short rainy season.

There are few endemic families, Takhtajan (1969) mentions *Kirkiaceae* and *Barbeyaceae*, and few endemic genera, but a large number of endemic species. The characteristic genera of the region include *Acacia*, *Combretum*, *Terminalia*, *Brachystegia*, *Hyparrhenia*, etc.

Three domains are recognized by White in his recent revisions of African phytogeography (White, 1965; Chapman & White, 1970): the Sudanian, Oriental and Zambezian Domains.

a. The deciduous woodlands and woodland savannas of the Sudanian Domain stretch from the Atlantic coast of Senegal eastwards to the frontier of the Sudan Republic with Ethiopia. This eastern boundary may require adjustment when the flora of southern Sudan to the east of the White Nile is better known. Important genera include *Anogeissus*, *Terminalia*, *Hyparrhenia* and *Andropogon*. *Isobertinia doka* Craib & Stapf and *Khaya senegalensis* (Desr.) A. Juss. are also characteristic of this domain.

b. The Oriental Domain of White includes lowland Ethiopia, Somalia and the lowlands of Kenya and Tanzania, and largely corresponds to a combination of the Domains Somalo-éthiopien and Domains oriental of Lebrun (1947) and Monod (1957). Although agreeing with White in uniting the two domains, I regard the choice of 'Oriental' as unfortunate in that it could

be confused with south-east Asia; to my certain knowledge it has thus misled at least one prominent botanist. My colleague, Mr F. N. Hepper (in Clayton & Hepper, 1974) has suggested using the term Afroriental in order to avoid any such confusion.

Physiognomically the vegetation of the Afroriental Domain ranges from thorn savanna to thorn thicket and scrub. Floristically it is distinguished by such endemic monotypic genera as *Cephalopentandra* (Cucurbitaceae), *Dicraepetalum*, *Platycephalum*, *Vatovaea* and *Spathionema* (Papilionoideae) and by a number of endemic species within such genera as *Acacia* (*A. lahai* Steud. & Hochst. ex Benth., *A. dolichocephala* Harms, *A. bussei* Sjösted, etc.), *Commiphora*, *Combretum*, *Terminalia* and the cactiform *Euphorbia*.

c. White recognizes an impoverished Sahelian extension of the floristically rich Afroriental Domain. Physiognomically and floristically it is similar to the Afroriental Domain with a number of important species in common, e.g. *Acacia nubica* Benth., *A. senegal* (L.) Willd., *A. seyal* Del., etc. *Terminalia* is absent and there is not the wide speciation found among the cactiform *Euphorbia*. There are also a number of endemic species, such as *Combretum glutinosum* Perr. ex DC, *Guiera senegalensis* J. F. Gmelin, *Bauhinia rufescens* Lam., *Piliostigma reticulatum* (DC) Hochst., etc. In my opinion the extension could conveniently be given the status of Sahelian Domain.

The Sahelian Domain forms a narrow belt stretching from the Atlantic coasts of Mauritania and Senegal eastwards to the Red Sea coast of the Sudan Republic, and thus separates the desert flora of the Sahara from the deciduous woodlands, etc. of the Sudanian Domain.

The southern boundary of the Sahelian Domain largely corresponds to the southernmost extent of the Pleistocene sand invasion (Fig. 23). During the Pleistocene much of the pre-Pleistocene flora must have been destroyed, the remainder pushed further south. Recolonization of the sands when the climatic conditions improved must have been relatively slow, due to the raw nature of the soil and the low water holding capacity of the dunes. The Pleistocene clay plains, which occupy such a large area in the Sudan, support a more xerophytic flora than the rainfall would appear to warrant. This is due to the very poor water penetration properties of the clays, plus the low availability of the soil moisture to the plant.

d. The South Arabian Domain includes parts of Saudi Arabia, Yemen and South Arabia bordering the coasts of the Red Sea and the Gulf of Aden; inland it is provisionally delimited by the 100 mm isohyet of Griffiths & Hemming (1963). This Domain corresponds to the Sous-domain sud-arabique of Monod (1957).

Studies for a flora of Arabia are at present being undertaken by Miss D. Hillcoat, at the British Museum (Natural History); the earlier works of Blatter (1919-36) and Schwartz (1939) are the main sources of our present knowledge of the flora. Very little has been written on the ecology of the Arabian Peninsula. The vegetation of the Red Sea coast north of the Yemen

border, and of central and eastern Arabia to the north of the Tropic of Cancer has been described by Vesey-Fitzgerald (1955, 1957a, b). However, there appears to be no available published information on the vegetation of southern Arabia, apart from what can be gleaned from Popov & Zeller (1963). The presence of such characteristic Afroriental Domain genera as *Commiphora*, *Boswellia*, cactiform *Euphorbia* and *Draacaena* and Sahelian species such as *Acacia tortilis* (Forsk.) Hayne and *Salvadora persica* L. were noted by the two authors. *Terminalia* is noticeably absent, in fact the only representative of the Combretaceae is *Combretum molle* R.Br. ex G.Don. The impression obtained is that the South Arabian Domain appears to be less impoverished than the Sahelian Domain, but more impoverished than the Afroriental Domain.

It may well be that when the floras of both the Sahelian and South Arabian Domains are better known, their status will be reduced to being subdomains of the Afroriental Domain. Initially it seems preferable to treat them as separate domains, having an affinity with the Afroriental Domain, rather than as subdomains which would imply a stronger affinity than may actually be the case.

e. The Zambezi Domain comprises the remainder of the area. Physiognomically similar to the Sudanian Domain but with a richer flora. Characteristic genera include *Brachystegia*, *Julbernardia* and *Isoberlinia* over most of the plateau and the monotypic *Colophospermum mopane* (Kirk ex Benth.) Kirk ex J. Léon. in the lowland plains. The phytogeography of the Flora Zambesiaca area within the Domain is discussed by Wild (1968).

2 Guineo-Congo Region

This region is represented by the flora of the evergreen or partly evergreen forests bordering the west coast of Africa from Gambia southwards to the Congo border with Angola and extending eastwards to the Ruwenzori Mountains. White (1965) points out that much of the Lake Victoria basin is, or was formerly, occupied by evergreen forest of Guineo-Congo affinity and that the area should be regarded as an extension of the Guineo-Congo Region or as transitional between it and the Afro-montane Region. There is also a gap in the coastal strip between Ghana and Dahomey; this gap is due to an inadequate rainfall for forest development.

The climate is characteristically one of high, even temperatures and rainfall throughout the year, although on both the Guinean and East African coasts there is a brief period when the rainfall slackens slightly.

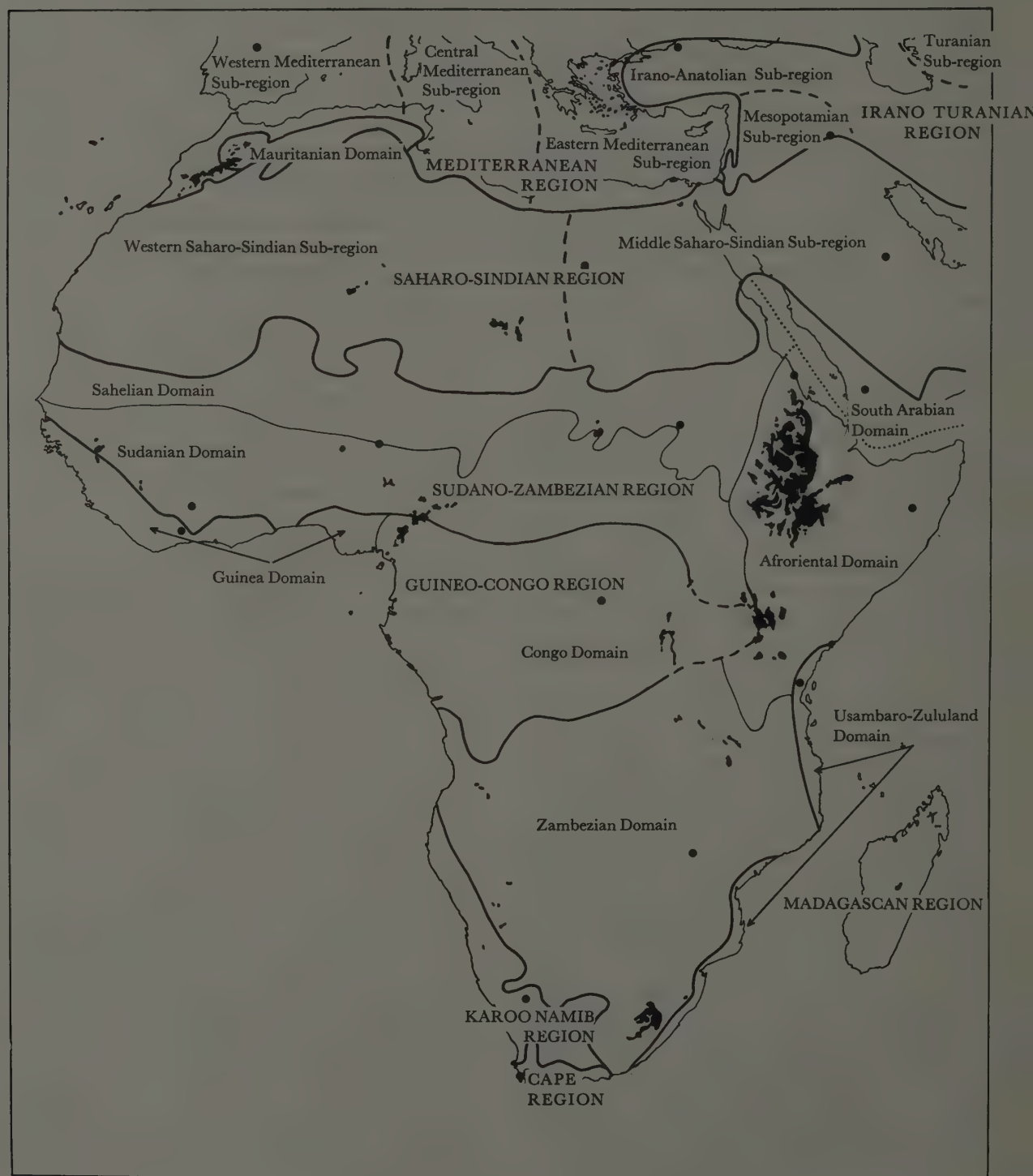
The flora has been carefully studied by Brenan (1954), who records the following endemic families: *Dioncophyllaceae*, *Scytotetalaceae*, *Lepidobotryaceae*, *Octonemaceae*, *Medusandraceae*, *Pentadiplandraceae* and *Hoplostigmataceae*. Although Africa probably compares favourably with the other continents as far as the actual number of endemic families is concerned, the prolific speciation seen among the rain-forest genera in other parts of the world is absent. In the Leguminosae the more important endemic genera are, according to

Brenan (1965), *Monopetalanthus*, *Tessmannia*, *Hymenostegia*, *Gilbertiodendron*, *Anthonotha* and *Berlinia*. Other important genera are *Cola* (Sterculiaceae), *Ficus* (Moraceae), *Rinorea* (Violaceae), *Dichapetalum* (Chailletiaceae), *Ouratea* (Ochnaceae) and *Diospyros* (Ebenaceae); *Casearia* (Flacourtiaceae), a small genus, is of interest since a representative, *C. barteri* Masters, occurs on Jebel Marra. In certain genera such as *Acacia*, *Strychnos*, *Dalbergia* and *Combretum*, richly represented

in the savanna areas by trees and shrubs, their forest representatives are often lianes.

The forests of Eastern Nigeria form a natural division of the Region into the Guinea and Congo Domains. The Guinea Domain is much poorer in endemic genera than the Congo Domain, the western section of the Guinea Domain being poorer than the eastern section in Nigeria. Thus, among the *Leguminosae* Brenan (1965) lists 3 endemic genera for the Guinea Domain, 14 for

Fig. 18 The phytogeographical divisions of Africa (montane regions in black)



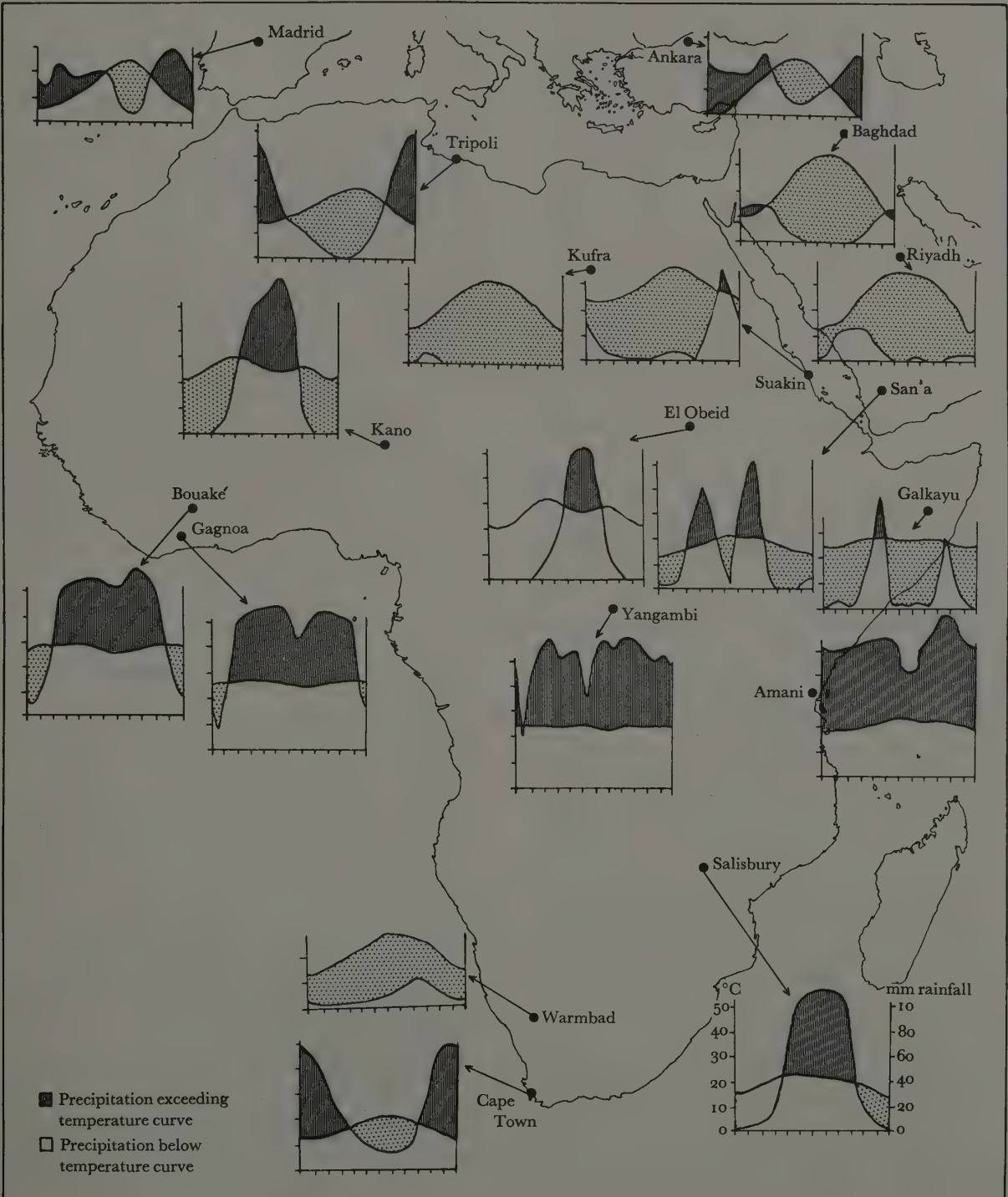
the Congo Domain (the majority of these genera are monotypic) and 34 omni-Guineo-Congo Region.

Monod (1957) recognized an extension of the Guineo-Congo Region along the east coast of Africa, forming a narrow, intermittent strip of forest from Kenya southwards to Cape Province. Monod called this extension 'Domaine forestier oriental', which White, in Chapman & White (1970), has renamed the Usambara-Zululand Domain in order to avoid con-

fusion with the Oriental Domains of Lebrun (1947) and White (1965).

The lowland forests of the Usambara-Zululand Domain were once far more extensive, much having been destroyed by fire and cultivation. The rich flora has been analysed by White: endemic genera include *Englerodendron* and *Schefflerodendron*, while among the endemic species not known from the main Guineo-Congo Region are *Casearia gladiiformis* Masters, *Cola*

Fig. 19 Climatic diagrams (overlay to Fig. 18).



mossambicensis Wild, *Mascarenhasia variegata* Britten & Rendle, etc.

3 Afro-montane Region

Drude (1893-97) regarded the ericaceous and alpine vegetation belts (see below) on Cameroun Mountain and the mountains of East Africa and Ethiopia as belonging to 'la région des hautes montagnes de l'Afrique tropicale'. Later workers, e.g. Engler (1908), Monod (1957), Letouzey (1968), etc., treated the montane floras as facies of the various regions in which they occurred. The concept of regarding the region as 'islands' of montane vegetation dispersed through the Sudano-Zambezian and Guineo-Congo Regions has now been recognized by White (1965).

The high mountains of the Sahara consisting of the Ahaggar, Tassili des Ajjer, Tibesti, etc. found within the Saharo-Sindian Region, are not considered to be part of the Afro-montane Region because of the high Mediterranean element, etc. in their floras. Neither is Jebel 'Uweinat' described by Léonard (1969) and Osborn & Krombein (1969), nor the massifs of Ennedi, Aïr and Adrar des Iforas, described by Gillet (1968), Bruneau de Miré & Gillet (1956) and Maire & Volkonsky (1945), for although lying within the Sahelian Domain, their floras are impoverished and lacking in the characteristic Afro-montane physiognomic types of vegetation. The affinities of the floras of Aïr and Tibesti are discussed by Bruneau de Miré, Gillet & Quézel (1957).

White, in Chapman & White (1970), discusses in great detail the status of the phytogeographical elements constituting the Afro-montane forest vegetation of Malawi. His ideas, with the emphasis on forest tree species, are equally applicable to the montane vegetation elsewhere in Africa. His endemic species are classified into 'nephews', with close relatives elsewhere in the African flora and 'orphans', where nearest relatives are no longer to be found in Africa. Among the 'orphans' is *Polyscias fulva* (Hiern) Harms; in Africa *Polyscias* is almost entirely confined to the mountains, including Jebel Marra, although there are c. 100 species to be found elsewhere in the old World tropics.

In addition to the endemic species White recognizes five categories of connecting and foreign elements, based on a combination of distribution and ecology, namely:

- 1 Ecological transgressors. These are species which are not only widespread in two or more phytogeographical regions, but also occur in at least two physiognomic vegetation types. These include *Cordia abyssinica* R.Br. and *Trichilia emetica* Vahl, both of which occur in the Jebel Marra area.
- 2 Forest pioneer connecting species. These forest pioneer species, found throughout tropical Africa, include *Trema orientalis* (L.) Blume and *Maesa lanceolata* Forsk., both of which occur in the gallery forests of Jebel Marra.
- 3 Marginal intruders. These are species which overlap phytogeographical boundaries.

4 Fringing forest species.

5 Palaeoclimatic relics. Both this and the previous category are self-explanatory.

White has dealt adequately with the montane forest flora of Malawi, but there has been no general description for the Afro-montane Region as a whole. The greatest development of the flora occurs in East Africa, so this must be the starting point for a general survey of the region.

In the mountains of East Africa Hedberg (1951, 1955) has distinguished three main vegetation belts, namely:

- 1 Montane Forest Belt.
- 2 Ericaceous Belt.
- 3 Alpine Belt.

The first two belts constitute the Afro-montane Region, while the third forms the Afro-alpine Region, and is considered separately.

Within the Montane Forest Belt Hedberg recognized three distinct zones, namely:

- 1 Montane Rain-forest Zone, which contains such important species as *Juniperus procera* Hochst. ex Endl., *Podocarpus milanjanus* Rendle, *P. gracilior* Pilger, *Olea africana* Miller, *O. hochstetteri* Baker, *Prunus africana* (Hook.f.) Kalkman, *Ekebergia capensis* Sparrm. and *Lepidotrachelia volkensii* (Guerke) Leroy; Hedberg (1951) also accepts the fact that drier forest types may also occur within the zone.
- 2 Bamboo Zone, dominated by *Arundinaria alpina* K. Schum.
- 3 *Hagenia-Hypericum* Zone, with *Hagenia abyssinica* (Bruce) J. F. Gmelin and *Hypericum lanceolatum* Lam. as the major constituents.

All three zones do not necessarily have to be represented on a mountain since such factors as latitude, altitude, aspect and other ecological factors must affect the vegetation.

Above the Montane Forest Belt is the Ericaceous Belt, mainly dominated by arborescent or shrubby species of *Philippia* and *Erica*, also with much *Stoebe kilimandscharica* O.Hoffm., *Adenocarpus mannii* (Hook.f.) Hook.f., etc. Open grassland with scattered ericaceous trees and shrubs is often present in the lower part of the belt.

Pichi-Sermolli (1957) has described a similar zonation and flora for the mountains of Ethiopia. In the Sudan the Dongotona and Didinga Hills and the Imatong Mountains, described by Jackson (1950, 1951, 1956), and summarized in Harrison & Jackson (1958), have a similar zonation and flora.

In the Red Sea Hills, which may be regarded as an impoverished extension of the Ethiopian highlands, *Juniperus procera* Hochst. ex Endl. occurs near the Eritrean border, while *Olea africana* Miller extends northwards to Jebels Elba and Asoteriba on the Egyptian frontier. Popov & Zeller (1963) also record *Juniperus* and *Olea* from the Hejaz and Asir mountains of Arabia

and note the similarity of the montane flora with that of Ethiopia.

Except for such species as *Polyscias fulva* (Hiern) Harms, *Trema orientalis* (L.) Blume, etc. in the gallery forests, the Montane Forest Belt is not well represented on Jebel Marra. The Ericaceous Belt is better represented as open grassland with *Blaeria spicata* Hochst. ex A. Rich subsp. *spicata*, *Olea laperrinei* Batt. & Trab., etc. substituting for the *Philippia*, etc. The Jebel Marra massif must be regarded as having a somewhat impoverished Afro-montane flora.

In West Africa the montane vegetation has been described in somewhat scattered literature. The Nimba Mountain has, however, been described in great detail by Schnell (1952). The Montane Forest Belt is again not particularly well developed, being represented by *Olea hochstetteri* Baker, *Trema orientalis* (L.) Blume, *Maesa lanceolata* Forsk., etc. The grassland of the Ericaceous Belt is better represented. The Nimba Mountain, like Jebel Marra, should be regarded as a somewhat impoverished member of the Afro-montane Region.

The vegetation of Cameroon Mountain and the Bamenda Highlands, etc. have been briefly surveyed by Keay (1953). For more detailed surveys see Keay (1955), Richards (1963), Hepper (1965, 1966), Letouzey (1968), Tuley (1966) and Tuley & Jackson (1971); Hall (1971) ably summarizes the available information on Nigeria's highlands. These montane areas have quite strong affinities with those of East Africa, with such species in common as *Podocarpus milanjianus* Rendle, *Olea hochstetteri* Baker, *Arundinaria alpina* K. Schum., *Hypericum lanceolatum* Lam., *Philippia* spp., *Adenocarpus mannii* (Hook.f.) Hook.f., *Agauria salicifolia* (Lam.) Oliver, etc.

The phytogeography of the West African mountains has been recently surveyed by Morton (1972), where, quite rightly in my opinion, he emphasizes the importance of climatic changes in the evolution and dispersal of the montane flora.

The montane vegetation of southern Africa is discussed by White, in Chapman & White (1971). He noted that the forests of South Africa have a similar floristic composition to the montane forests of Malawi, which in turn are related to those of East Africa. He also observed that with increasing latitude the forests descend to lower altitudes until at Knysna the forests occur at almost sea level.

4 Afro-alpine Region

The existence of an 'Alpine Region' in the Ethiopian Highlands was recognized by Schweinfurth (1868) but it was Hauman (p. 902, 1933) who first proposed the term 'afro-alpine' for the high altitude *Senecio* vegetation of Ruwenzori. Later the term 'Afro-alpine Region' was proposed by Hauman (1955) for the high altitude flora of the East African mountains, notably the Virunga Volcanoes, Ruwenzori, Elgon, Mount Kenya, Kilimanjaro and Mount Meru. The rich representation of afro-alpine plants in the high mountain flora of Ethiopia justifies an extension of the region to in-

clude Ethiopia. In view of the absence in Ethiopia of *Senecio* subgen. *Dendrosenecio* and almost all shrubby *Alchemilla* species and the presence of such genera as *Rosa* and *Primula*, the latter area is considered by Pichi-Sermolli in Exell (1955), Pichi-Sermolli (1957) and Hedberg (1961, 1965) to be best treated as a separate subregion, although no formal name has yet been proposed.

Hedberg (1951) categorically states that the term 'Afro-alpine' should never be considered homologous with the Alpine belt of Europe, where it can be defined as being the vegetation above the upper limit of tree growth. In the high mountains of Africa, tree growth, as represented by the Giant *Senecios*, can extend to the upper limit for the growth of vascular plants.

The objections of Coe (1967) and other authors to the term 'Afro-alpine', on the grounds that it can be confused with the Alpine belt of Europe is not considered really justified, especially as the prefix 'Afro-' is used in order to emphasize its distinction.

Afro-alpine is defined by Hedberg (1951) as the zone situated above the Ericaceous Belt, i.e., above the upper limit of the more or less continuous tree or shrub Ericaceous vegetation. Characteristically, the Afro-alpine vegetation is represented by tufted grassland with Giant *Senecios*, Giant *Lobelias* and shrubby *Alchemillas*. Climatic and other ecological factors are discussed by Hedberg (1964). Floristically it is not easy to distinguish between this region and the lower Afro-montane Region. Four endemic genera, *Keniochloa*⁽¹⁾ (Gramineae), *Oreophyton* (Cruciferae), *Haplosciadium* (Umbelliferae) and *Dianthoseris*⁽²⁾ (Compositae) are almost entirely confined to the Afro-alpine belt; *Keniochloa* is found only on Kilimanjaro and Mounts Kenya and Elgon, while the other three genera range from the East African mountains to Ethiopia. *Senecio* subgen. *Dendrosenecio*, an endemic subgenus, is likewise almost entirely confined to the Afro-alpine belt of the East African mountains.

Phytogeographically the Afro-alpine flora is from a complex derivation (Hedberg, 1961). The high degree of endemism is, according to Hedberg (1969, 1970), an indication of long isolation of the various mountain peaks.

The distribution of the Afro-alpine flora in Africa is illustrated in Hedberg (1961). A list of strict Afro-alpine species, with their supposed phytogeographical affinities has been prepared by Hedberg (1965), of which the following thirteen species also occur on Jebel Marra:

Pentaschistis pictigluma (Steud.) Pilger
Vulpia bromoides (L.) S. F. Gray
Aira caryophyllea L.
Romulea camerooniana Baker

(1) *Keniochloa* is now included in the temperate Asiatic genus *Colpodium*. See Clayton, F.T.E.A. Gramin. :49 (1970).

(2) Jeffrey in Kew Bull. 18:433 (1966) has shown *Nannoseris* Hedberg to be a superfluous and therefore illegitimate name of *Dianthoseris* Schultz Bip. ex A. Rich.

Silene burchellii Otth ex DC.

Cerastium octandrum Hochst. ex A. Rich.

Myosotis abyssinica Boiss. & Reut.

Umbilicus botryoides Hochst. ex A. Rich.

Caucalis melanantha (Hochst.) Hiern

Satureja punctata (Benth.) Briq.

Festuca abyssinica A. Rich.

Poa leptoclada Hochst. ex A. Rich.

Parietaria debilis Forster f.

The following eight species from Jebel Marra also occur among the Afro-alpine species listed by Hedberg (1957), but because they occur only sporadically in the lower part of the Afro-alpine belt, they were excluded from his 1965 list:

Potamogeton schweinfurthii A. Bennett

Helictotrichon elongatum

(Hochst. ex A. Rich.) C. E. Hubbard

Cyperus rigidifolius Steud.

Juncus dregeanus Kunth subsp.

bachitii (Hochst. ex Steud.) Hedberg

Oxalis corniculata L.

Malva verticillata L.

Galium thunbergianum Ecklon & Zeyher

Gnaphalium luteo-album L.

There is no suggestion of an Afro-alpine Region on Jebel Marra, merely the representation of an Afro-alpine element in the montane flora.

5 Cape Region

This region, with its very distinctive flora and Mediterranean climate, has been placed in a separate kingdom, the Cape Kingdom, by earlier phytogeographers and more recently by Takhtajan (1969). Monod (1957), White (1965), etc., prefer to regard it as being within the Palaeotropical Kingdom.

The region is located along the coastal strip of the south-western and southern parts of Cape Province. The vegetation, consisting of sclerophyllous shrubs and numerous geophytes, is known as Cape Macchia. Floristically it is extremely rich, with a large number of endemic species, genera and even families. The endemic families are, according to Takhtajan (1969), *Grubbiaceae*, *Roridulaceae*, *Bruniaceae*, *Penaeaceae*, *Greyiaceae*, *Geissolomataceae* and *Retziaceae*.

The families, *Bruniaceae*, *Restionaceae*, *Proteaceae* and *Ericaceae* and genera such as *Aspalanthus* (Leguminosae) and *Heliophila* (Cruciferae) are particularly well represented; it is also noticeable that many species are very restricted in their distribution.

The phytogeography of the region has been investigated by Weimarck (1941), who recognized five centres of endemism within the region.

6 Karroo Namib Region

This region of Monod (1957) and White (1965) occurs in the low-rainfall areas of western Cape Province and South West Africa. The adaptation by plants for survival as succulents is extremely well marked; geophytes are also well represented.

The genus *Mesembryanthemum* sensu lato is particu-

larly well represented, as are also other genera in the Aizoaceae such as *Lithops* and *Conophytum*. Other characteristic genera of the region include *Oxalis*, *Pelargonium*, *Cotyledon*, *Crassula*, *Stapelia* and *Pentzia* (Compositae) and in the Namib the extraordinary *Welwitschia bainesii* (Welw.) Carr.⁽¹⁾ and *Acanthosicyos horridus* Welw. ex Benth. & Hook.f. (Cucurbitaceae).

Compton (1929) points out that the flora does not include representatives from some of the largest and most characteristic Cape families such as *Bruniaceae*, *Restionaceae*, *Proteaceae*, *Ericaceae*, etc.

7 Saharo-Sindian Region

As defined by Eig (1931), and generally accepted by modern phytogeographers, the region extends from the Atlantic coasts of Morocco and Mauritania eastwards across the Sahara, Sinai and extra-tropical Arabia, southern Iraq, Iran and Baluchistan to the deserts of Sind, Thar and the Punjab.

The characteristic climatic features of the region are high temperatures, often with violent and extreme diurnal fluctuations, and low and often erratic rainfall. In areas of true desert, which also occur within the region, the precipitation, if any, is insufficient to support life. The high temperatures and low precipitation produce a low humidity and evapo-transpiration rate.

The effect of this harsh climate is to favour xerophytic and ephemeral plants; a preponderance of halophytes is yet another reflection of an arid climate and its effect on soil salinity. In the semi-desert areas the vegetation is both scanty and monotonous. The number of species for the region is only c. 1500.

The flora is also remarkable in the absence of endemic families and in the small number of endemic genera, among which are *Neurada* (Rosaceae), *Nucularia*, *Fredolia*, *Agathophora* (Chenopodiaceae), *Zilla* (Cruciferae), *Ochradenus* (Resedaceae) and *Rhanterium* (Compositae). Among the characteristic species are, according to Eig (1931), *Salvadora persica* L., *Calotropis procera* (Aiton) Aiton f., *Panicum turgidum* Forsk., *Anabasis aphylla* L., etc. The distribution of two such omni-Saharo-Sindian species, *Cornulaca monacantha* Delile and *Moltkiopsis ciliata* (Forsk.) I. M. Johnston are shown (Figs. 20 & 21). I am grateful to Monsieur Lebrun for presenting me with these maps. The region may also be characterized as being the area of cultivation of the date palm.

According to Eig (1931), Zohary (1962), Davis & Hedge (1971) and others, the Saharo-Sindian flora has been derived from Mediterranean, Sudanian, and to a lesser extent, Irano-Turanian stock. This has led to some difficulty in deciding whether the region should belong to the Holarctic, as believed by Eig (1931) and Guest (1966), or according to Engler & Diels (1936) placed in the Palaeotropics. Monod (1939, 1957) and

(1) The vexed question of *Welwitschia bainesii* (Welw.) Carr. versus *W. mirabilis* Hook.f. has been submitted to the Standing Committee on the stabilization of names of plants of economic importance for a ruling (see Dyer & Verdoorn in *Taxon* 21:485-89 (1972)).

Quézel (1965) consider the region to be partially in both kingdoms.

Eig (1931), Zohary (1962), Guest (1966), etc., recognize three sub-regions within the region. The Western Saharo-Sindian Sub-region stretches from the Atlantic coast eastwards to the Egyptian frontier in the Libyan Desert. The flora of the sub-region has been studied by Ozenda (1958), and contains less than 500 species; its phytogeography has been studied by Quézel (1965), who recognizes seven domains, including the Saharo-montane, which has a number of endemic species of Mediterranean affinity. The Saharo-montane Domain, which includes the Ahaggar Mountains and its outliers, Tefedest, Mouydir and the Tassili des Ajjer, and Tibesti, has a number of species in common with Jebel Marra, including *Silene lynesii* Norman and *Olea laperrinei* Batt. & Trab., species which are otherwise unknown outside the domain.

The Middle Saharo-Sindian Sub-region includes Egypt, Sinai, parts of lower Israel, much of central and southern Jordan, extra-tropical Arabia and lower Iraq. The Libyan Desert appears to have been an effective barrier between the two sub-regions for there are at least 200 new species found in the Middle Saharo-Sindian Sub-region not encountered further to the west.

The remainder of the region is known as the East Saharo-Sindian Sub-region.

8 Mediterranean Region

The characteristic climate of this region is of hot, dry summers with mild winters during which much of the rain falls. The typical vegetation consists of sclerophyllous and deciduous forests and xerophytic shrub communities. It can also be defined as being the area where the olive is cultivated.

The boundaries of the region have been variously defined. For this work I have followed Eig (1931), Zohary (1962) and Guest (1966) in that the eastern limit coincides with the fading out of the shrubby and forest communities of the Levant maritime districts and does not extend further eastwards into Iraq. It also includes the greater part of the Iberian peninsula, the northern and southern Mediterranean coasts and with enclaves along the Black Sea coast.

In Morocco, the Mauritanian steppe, included by Eig (1931) within the Saharo-Sindian Region has been transferred by Zohary (1950, 1962) to the Irano-Turanian Region because of its close floristic affinities with other parts of that region; Monod (1939, 1957) has placed it in the Mediterranean Region while Takhtajan (1969) has followed Zohary. For this work I also have followed Zohary.

The Mediterranean Region is floristically very rich, with such families as the *Leguminosae*, *Caryophyllaceae*, *Boraginaceae*, *Liliaceae*, etc., particularly well represented. There are numerous endemics. Raven (1971)

Fig. 20 Distribution of *Cornulaca monacantha* (by J.-P. Lebrun).

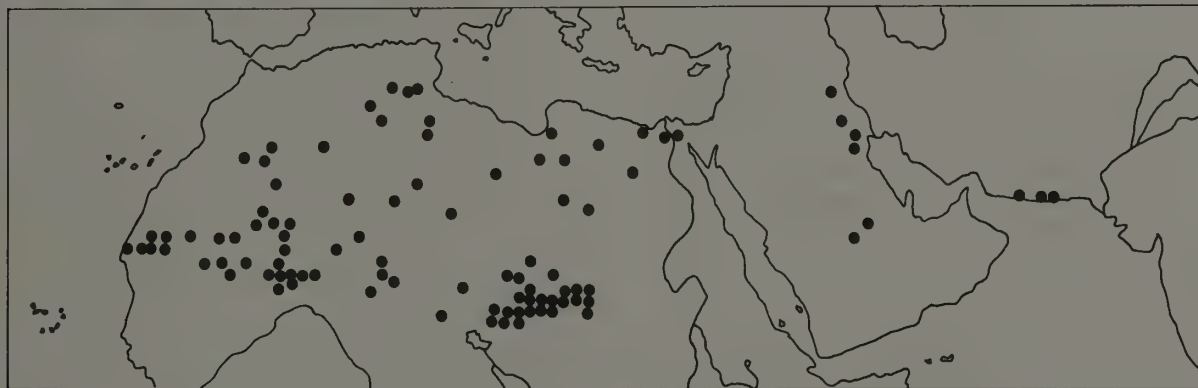
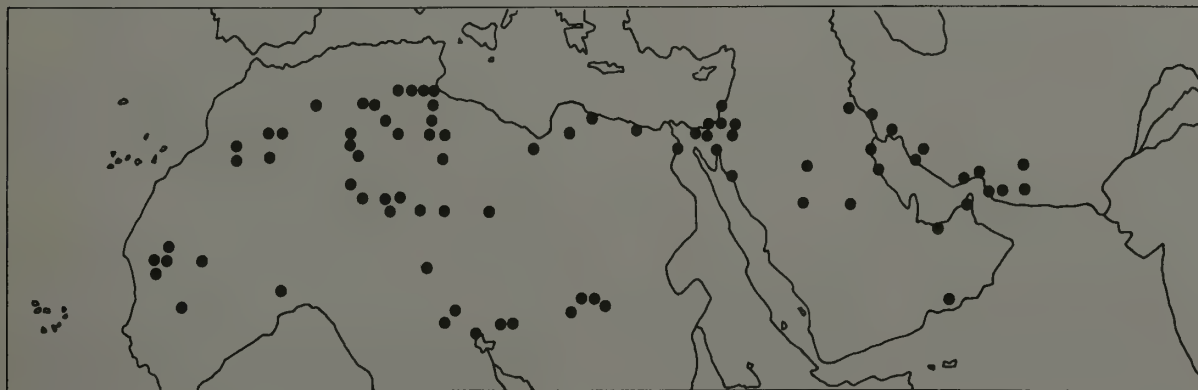


Fig. 21 Distribution of *Moltkiopsis ciliata* (by J.-P. Lebrun).



estimates that 10 percent of the genera and 40 percent of the species are endemic to the region. Takhtajan (1969) records one endemic monotypic family, the *Aphyllanthaceae*, while among the many characteristic or endemic species are *Quercus* spp., *Cistus* spp., *Myrtus communis* L., *Nerium oleander* L., *Laurus nobilis* L., etc. *Ceratonia siliqua* L., *Cercis siliquastrum* L. and *Pinus halepensis* Miller are also representative species.

9 Irano-Turanian Region

The region includes much of Turkey and northern Iraq and Iran and parts of Kazakhstan. The climate is one of low rainfall, high summer temperatures and severe winters, with the minimum temperatures being much lower than for either the Mediterranean or the Saharo-Sindian Regions. Plant growth is arrested by the extreme heat and aridity of the summer months, and by the intense cold and snow during the winter.

The vegetation of the region is characteristically one of steppe. Floristically extremely rich, *c.* 12 000 species, with a high proportion of endemic species and genera but no endemic families. Among the important genera are *Astragalus* (Leguminosae) with 900–950 species, *Cousinia* (Compositae) with 160–180 species, *Centaurea* (Compositae) with *c.* 200 species, *Allium* (Liliaceae) with more than 150 species, *Salvia* with over 100 species, *Acantholimon* (Plumbaginaceae), etc. Certain typical Mediterranean genera, e.g. *Cistus*, are absent from the region.

Several sub-regions are recognized by Zohary (1950)

and Guest (1966). These include the Mauritanian Steppe, Mesopotamian, Irano-Anatolian and Turanian Sub-regions.

The Mauritanian Steppe Sub-region forms a belt separating the Saharo-Sindian from the Mediterranean Regions in Morocco and probably forms a tenuous or intermittent region along the Libyan and Egyptian coast (see Davis & Hedge, 1971, for further discussion). The sub-region is also discussed under the Mediterranean Region (p. 47).

The Mesopotamian Sub-region contains the Syrian Desert, almost the whole of the Jazira, parts of the southern Anatolian plains and some of the Iranian territory. Characteristically steppe or sub-desert communities, poor in species.

The Irano-Anatolian Sub-region comprises the montane area of inner Anatolia and Armenia, the Iranian montane plateaux and much of Transcaspia. With high mountain ranges alternating with poorly drained valleys and basins, the diverse habitats have led to much speciation, especially among such genera as *Astragalus*, *Onobrychis* (Leguminosae), *Centaurea*, *Cousinia*, *Helichrysum* (Compositae), etc.

The Turanian Sub-region contains that vast lowland steppe and desert between the Caspian Sea and the mountains of central Asia. The *Chenopodiaceae* are particularly well represented in the sub-region by such genera as *Calligonum*, *Haloxylon*, *Suaeda*, *Salsola*, *Artemisia*, etc.

Chapter 10

Continental drift and African geomorphic history

Recent advances in palaeomagnetism, crustal spreading and plate tectonics have virtually confirmed the theory of continental drift (Royal Society, 1965). This theory acknowledges the former existence of the jigsaw assemblage of South America, Africa, Arabia, the Antarctic, Australia and New Zealand to form a super-continent known as Gondwanaland (Gilbert Smith & Hallam, 1970). With fresh information now becoming available in increasing quantity it is almost impossible to publish an account of the formation and break-up of Gondwanaland, let alone the other land mass, Laurasia, without at least some of the account being out of date. This present account will be no exception.

According to Smith (1971), Gondwanaland came into existence *c.* 500 million years ago and probably continued as a single entity until the Jurassic, *c.* 190 million years ago. Evidence from the Permo-Carboniferous glaciation in southern Africa, with corroborative evidence from Brazil, places Gondwanaland near the South Pole. Further evidence from Triassic rocks representing aeolian desert sands covering vast areas, suggest that South America and Africa were still close and probably joined together until the Upper Triassic, *c.* 200 million years ago. The desert conditions also suggest, either a shift in the world's climatic belts or a shift of Gondwanaland from near the South Pole towards the Equator.

Melville (1966, 1967), on evidence of the distribution of fossil *Glossopteridae*, the characteristic flora of Gondwanaland during the Carboniferous Period, suggests that the 'glossopterid line', indicating the northern limit for the distribution of the *Glossopteridae*, is also the northern boundary of Gondwanaland (Fig. 22). The line cuts off the north-western portion of Africa (for which there are no fossil records of *Glossopteridae*) to the north of a deep submarine trench off Sierra Leone in latitude $9-9^{\circ}$ N. Continuing eastwards across Africa the line passes to the north of Arabia and south of the Himalayas, placing India, Malaya, Sumatra, Bali, Borneo, Australia, New Zealand and its associated islands, Antarctica and South America to the south of the Amazon, together in Gondwanaland. Melville's reconstruction is also supported by recent geological, geomorphological and palaeomagnetic data.

The existence of Gondwanaland is also upheld by other botanists, e.g. Boughey (1957), Hawkes & Smith (1965) and Wild (1968), who maintain that the distribution of many groups of Angiosperms in the southern hemisphere can only be accounted for by the presence

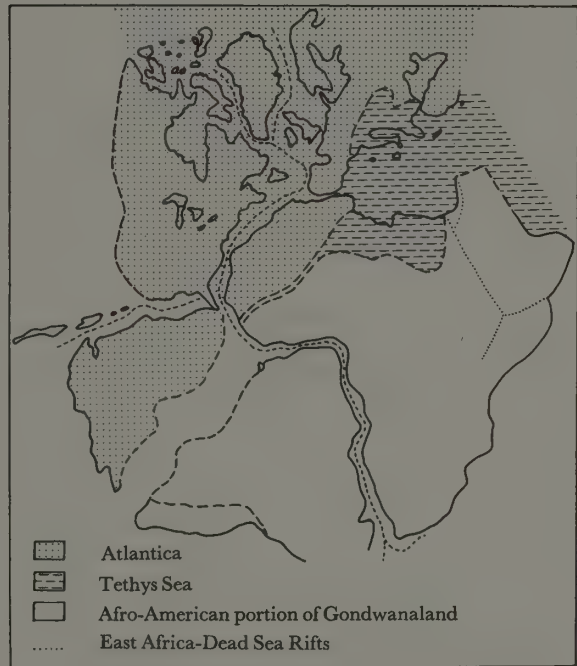


Fig. 22 The position of the Afro-American continent and Atlantica in the Jurassic.

of a continuous land mass such as Gondwanaland and not by long-distance dispersal, nor by the land bridge theory of van Steenis (1962). The existence of Angiosperms on Gondwanaland suggests that representatives of some modern genera of flowering plants were in existence at least by the Lower Cretaceous, 100–120 million years ago. Some aspects of this problem are discussed by Hawkes & Smith (1965).

An interesting and relevant account of the available information regarding the distribution of terrestrial amphibians, mammals and reptiles is given by Colbert (1973), from which it is clear that the biological data, although in general agreement with the geologist's interpretation of events, does raise some questions on the finer detail and of the timing.

There is at present considerable differences in opinion regarding the outline of the super-continents, especially of the northern land mass, Laurasia, or even whether there was one super-continent, Pangaea, with the two land masses of Gondwanaland and Laurasia partially separated by the Tethys Sea. Since both knowledge and ideas are now accumulating with extreme rapidity, it would be fruitless to follow the various arguments in too great detail, consequently

only a brief and often incomplete outline of events is given here, with the emphasis on the southern land mass of Gondwanaland.

It has been suggested by King (1973) that Iran broke away from Gondwanaland probably during Permian times, drifted northwards and became involved in Tethyan events. According to Vine (1971), the Antarctic and Australian block separated from the rest of Gondwanaland during the Lower Triassic, while Sowerbutts (1972) is less precise, suggesting that the separation took place at some time during the Upper Triassic–Lower Cretaceous. New Zealand and the Lord Howe rise separated from Australia some 80 million years ago, during the Upper Cretaceous (Tarling, 1972b), while the opening of the ocean between Australia and Antarctica took place during the Eocene (Veevers *et al.*, 1971; Tarling, 1972b).

The opening of the gap between South America and Africa also began during the Lower Jurassic and continued into the Lower Cretaceous. South-east Asia (Malaya) is also believed to have separated from Gondwanaland during the Jurassic (Ridd, 1971).

India may have separated from the remaining part of Gondwanaland during the Middle to Late Cretaceous. During this period Gondwanaland remained separated from the northern continents by the Tethys Sea.

During the Carboniferous period Laurasia is con-

sidered by Melville to have formed three subcontinental masses known as Atlantica, Pacifica and Angara. Atlantica consisting of eastern North America, western Europe, northern South America and north-western Africa, supported the characteristic flora of our Carboniferous coalfields. Pacifica included China and south-east Asia and western North America, and supported a Cathaysian or Gigantopteris flora. The third continent, Angaraland, occupied Siberia and adjacent regions to the south, and again had a characteristic flora.

During the Triassic Angaraland drifted into contact with Pacifica; the western half of Pacifica with Angaraland drifted westwards to join the western half of Atlantica while the western half of Atlantica drifted into contact with the eastern half of Pacifica, the northern continents of North America and Eurasia thereby being formed towards the end of the Cretaceous.

India may also have drifted into contact with the newly formed Eurasia at about the same time although Veevers *et al.* (1972) suggest that the collision between India and Asia did not take place until the end of the Eocene. According to Melville, the comparatively rapid south to north drift of India subjected its flora to maximum climatic stress. The rich Mesozoic gymnosperm flora of India was almost entirely exterminated; even today the flora of the Gondwanaland part of India

Table 2 Chronology of events during period of continental drift and African geomorphic history (not drawn to scale)

Million years BP	Period	Epoch	Gondwanaland	Africa	Sudan	Northern Hemisphere
	<i>Quaternary</i>	Holocene				
		Pleistocene			Sand invasion of northern Sudan	
2.5	<i>Tertiary</i>	Pliocene		major uplift in East Africa	2nd eruptive and explosive phase of Jebel Marra	Opening of the Straits of Gibraltar
7		Miocene		major rifting in Red Sea, Gulf of Aden, Ethiopia and East Africa	1st eruptive phase of Jebel Marra. Upwarping with formation of Red Sea Hills, Nile-Chad and Nile-Congo divides	Sea connection between Tethys and Indian Ocean broken
26		Oligocene		Volcanic activity in Ethiopia		
38		Eocene	Separation of Australia from Antarctica		Retreat of Tethys Sea from Sudan. Erosion of the Nubian Series	

Table 2 Continued

Million years BP	Period	Epoch	Gondwanaland	Africa	Sudan	Northern Hemisphere
54		Palaeocene		Outline of Eurasia and Africa similar to present-day		
65	<i>Cretaceous</i>	Upper	India in contact with Eurasia			Formation of N. America and Eurasia
		Middle	<div> <div> </div> <div> </div> </div> Separation of New Zealand from Australia Separation of India from Gondwanaland	Separation of Africa and Madagascar		
		Lower		Separation of South America from Africa completed		Europe (eastern Atlantica) separated from eastern N. America (western Atlantica)
136	<i>Jurassic</i>	Upper	?Separation of south-east Asia from India	Africa in contact with Algeria and Morocco	<div> </div> Deposition of Nubian Series in northern and western Sudan	
		Lower	Separation of Australia + Antarctica from Gondwanaland	South American beginning to separate from Africa; beginning of fracturing between Africa and Madagascar		
190	<i>Triassic</i>					Angara in contact with Pacifica
225	<i>Permian</i>		Separation of Iran from Africa			
280	<i>Carboniferous</i>					Existence of Atlantica, Pacifica and Angara
345	<i>Devonian</i>					
395	<i>Silurian</i>					
440	<i>Ordovician</i>					
500	<i>Cambrian</i>		Formation of Gondwanaland			
570						

is much poorer than those of Africa and south-east Asia.

It is claimed by Tarling (1972a) that the initial fracturing between Africa and Madagascar began in the Jurassic. The biotic relationship between the two land masses suggests that there was free migration between them from Jurassic times until the final separation in the mid-Cretaceous. Until recently, geophysicists had believed that Madagascar had been united to Africa in the region of the Kenya coast. There is now strong evidence to suggest a more southern derivation from the Mozambique area (Tarling, 1972b). This new positioning will mean that the entire jigsaw arrangement of the continents forming Gondwanaland will have to be readjusted and the subsequent history of the breakup somewhat modified.

Contrary to the general assumption that the Mediterranean part of Tethys flowed westward through the Straits of Gibraltar to link up with the Pacific, no such passage existed during the Mesozoic. There is evidence to show that marine invasions from the Pacific side did not penetrate northwards of the north Amazonian province of South America until the Upper Jurassic. Melville suggests that it is probable that Tethys passed south of Algeria and Morocco and then westwards to south of the Guiana heights (Fig. 22).

Africa drifted into contact with Algeria and Morocco probably towards the end of the Jurassic. Europe (eastern Atlantica) separated from eastern North America (western Atlantica) and Africa from South America during the Lower Cretaceous.

At some time during the Upper Cretaceous to Palaeocene, the eastward drift of Africa pivoting on Spain, swung Eurasia around, thereby narrowing the Mediterranean Gulf and bringing Arabia into contact with Eurasia. The Straits of Gibraltar opened at the start of the Pliocene thus permitting the Atlantic to enter the previously land-locked Mediterranean (Davis & Hedge, 1971). The general outlines of the continents were then similar to those of today. A summary of the events in chronological order is given in Table 2.

In the Sudan, an incursion by the Tethys Sea during the Jurassic and Cretaceous resulted in the laying down of extensive sedimentary rocks, principally sandstones with a few mudstones and limestones. These deposits are known as the Nubian Series and are found in the northern and western parts of the Sudan. They overlie the ancient igneous and metamorphic rocks known as the Basement Complex which are part of the ancient shield of Africa. These Basement Complex rocks were exposed throughout the Palaeozoic and the early part

of the Mesozoic Eras to sub-aerial denudation, during which most of the country was reduced to a peneplain, with certain resistant blocks such as the Nuba Mountains in Kordofan, the Imatong Mountains, etc. on the Sudan-Uganda border and the Tebella Massif, Kongyo Hills, etc. of Darfur, standing out as representatives of the pre-erosion land surface. During the Eocene period the Tethys Sea retreated, and extensive tracts were swept clear of the Nubian Series.

A gentle warping during the Upper Miocene–Lower Pliocene, with an uplift of the eastern part of the Sudan accompanied by faulting, gave rise to the Red Sea Hills (Barbour, 1961). There was also a slight upwarping along the Nile-Congo and Nile-Chad divides accompanied by volcanic activity in Darfur. The first eruptive phase of Jebel Marra took place during the Miocene, followed by a second eruptive phase and an explosive phase during the Lower Pleistocene.

During the Upper Miocene–Lower Pliocene there was also a major phase of rifting in the Gulf of Aden, Ethiopia and East Africa (Roberts, 1969). Gass & Gibson (1969) suggest that there was preliminary activity directly related to the formation of these rifts (including the Red Sea) dating as far back as the Cretaceous. The rifting between Arabia and Africa is still in progress (Sowerbutts, 1972).

In central Kenya there was a broad domal uplift of about 300 m during the Upper Miocene, which was followed by a major uplift of about 1400 m during the Upper Pliocene to Middle Pleistocene (Baker & Wohlenberg, 1971). This was accompanied by volcanic activity, resulting in the formation of the East African Highlands.

The geological history of Ethiopia is at present little understood. Mesozoic marine deposits overlie much of lowland Somalia and Ethiopia east of the rift system, with accumulations of Jurassic–Cretaceous sediments to a depth of over 3000 m in the Ogaden and southern Somalia (Mohr, 1971). Jakobsen (1971) refers to a basalt plateau and volcanic activity during the Cretaceous, with further and greater volcanic activity during the Cainozoic, which Berry & Whiteman (1968) and Roberts (1969) refer to the Oligocene. Moreau (1952) regards the Ethiopian plateau to have existed very much in its present shape from before the Cretaceous. Thus the Ethiopian plateau would appear to be considerably older than the neighbouring East African Highlands, a factor of considerable phyto-geographical interest.

Chapter 11

Africa during the Quaternary

1 General

The early theory that during the Quaternary period in Africa there were a number of widespread pluvial periods that could be correlated with the glacial periods in Europe now requires considerable modification. Indeed, recent palaeoecological and pedo-geomorphological researches have indicated that 'pluvials' were localized in Africa; while one area had a cool pluvial climate, another was having a cool arid climate (Coetzee, 1967; Coetzee & Zinderen Bakker, 1970). Furthermore, it is now realized that due to tectonic movements the chronostratigraphy based on a sequence of Quaternary pluvials is highly unreliable.

Moreau (1966) has postulated that the decreased evaporation associated with a decrease of 5°C could suggest 'pluvial' conditions without there being any increase in precipitation. Even a fall in temperature of 2° – 5°C would suffice to form causeways of suitable montane conditions along which biota could migrate and populate other montane areas. A return of temperature to present-day conditions would then isolate the redistributed biota. Direct contact between higher altitude vegetation enclaves, however, appears highly unlikely, and inter-mountain migration was probably by independent long-distance dispersal (Hedberg, 1969 & 1970).

Coetzee (1967) has plausibly demonstrated from her pollen analytical studies in the East African mountains that there have been a series of shifts in the vegetation of the high altitude zones due primarily to temperature fluctuations. Coetzee maintains that these temperature fluctuations are synchronous and parallel with those of Europe and tropical America, i.e., the temperature changes were on a global scale (see Williams, 1975 for further discussion).

These global temperature changes are explained by Flohn (1967) who shows how the climatic belts of the world are controlled by the temperature gradient between the equator and the two poles. During the Pleistocene there was very little variation in the climate of the southern hemisphere since the Antarctic ice-cap remained stable, with relatively little variation. The formation and melting of the Arctic ice-caps, however, brought about considerable changes in the temperature gradients for the northern hemisphere and caused the climatic belts to fluctuate considerably.

As the present-day Antarctic troposphere is *c.* 12°C cooler than the Arctic, the global meteorological equator is only near latitude 0° during the northern hemisphere's winter months of December and January

and shifts to about 10°N during the northern summer. This global asymmetry probably either partly or totally disappeared during the cold periods of the Pleistocene.

During these cold periods there would be a decrease in evaporation, thus permitting an increase in humidity without any increase in precipitation. As evaporation depends on net radiation at the earth's surface and wind speed, while precipitation depends on the shift of the climatic belt, both evaporation and precipitation can vary independently. Although changes in temperature can be representative for wide areas, humidity, as expressed by the difference between precipitation and evaporation, is of a local or regional character.

Coetzee's interpretation of her pollen diagrams from the East African mountains is based on the belief that the zonation of the vegetation belts is controlled primarily by the decrease of the mean annual temperature with increasing altitude. With a lapse rate of temperature of 1.6°C for every 300 m, relatively small changes in temperature must cause substantial changes in the vegetation. Morrison (1966) argues that there is still insufficient data as to the sensitivity of the montane vegetation to the climatic factor, neither are there sufficient radiocarbon datings to support the alleged relationship with European glacial movements.

However, Zinderen Bakker & Coetzee (1972) have concluded from a survey of a number of widespread climatic records that the temperature changes coeval with those of the northern hemisphere also occurred in tropical Africa, and that the changes in humidity were correlated with these temperature changes. Thus the climate during an interglacial period would be warmer and wetter, encouraging the extension of lowland forest, while during a glacial period the climate would become colder and drier, thereby encouraging the extension of lowland desert and the downward spread of montane species.

The calculations of Coetzee (1967) for a temperature decrease of 5°C , possibly more, fits in with Moreau's postulated extension of the montane forests through much of East Africa and across to the Cameroon, Congo and south-western Angola, approximating to the 500 m contour. This idea was based on a lapse rate of 5°C per 1000 m and a present-day lower limit of montane biomes in most of tropical Africa at about 1500 m.

Livingstone (1967), however, believes that the downwards shift of the vegetation belts could be explained equally well by changes in precipitation. Hedberg (1969) considers the downward shift in the vegetation

belts during the Pleistocene to have been less than 1000 m. He disputes Coetzee's conclusions on the grounds that the high altitude vegetation deduced from the pollen diagrams contained many species that could also occur at much lower altitudes provided the sites were open and dry enough. Consequently part of the changes in the pollen diagram could equally well be explained by changes in precipitation. The recent work in Uganda by Hamilton (1972), however, offers strong support to the ideas of Coetzee.

Hamilton (1972) has postulated the following sequence of climatic events for Ruwenzori during the past 15 500 years.

- 1 Prior to 12 600 BP, temperatures some 6°C lower than present and climate much drier.
- 2 c. 12 600 BP, a transition from a cold dry climate to moister and warmer conditions.
- 3 Following a transition period, the vegetation approximating to that of present day.
- 4 6000–2000 BP, slightly warmer and wetter climate than present with a small upward shift in the vegetation belts on Ruwenzori.
- 5 Widespread destruction of the lowland forests by man at c. 1000 BP with a lower intensity of human disturbance recorded back to 4000 BP.

Kendall (1969) working in northern swamps of the Lake Victoria basin gives the following sequence for the past 14 500 years.

- 1 Prior to 12 000 BP, climate dry with forest absent or of little extent.
- 2 12 000–10 500 BP, climate moderately wet with appearance of forest.
- 3 10 500–9500 BP, moderately dry with a short decline in forest at c. 10 000 BP.
- 4 9500–6000 BP, wet with a shift from evergreen to semi-deciduous forest after 7000 BP.
- 5 6000 BP, slightly drier or with a more seasonal rainfall.
- 6 Vegetation changes after 3000 BP complicated by human interference.

The Guineo-Congo rainforests also appear to have been subjected to periodic contractions and expansions. The low density of plant species (15 000 compared with more than 40 000 for South America) and the poverty of such typical forest families as the *Palmae* and *Araceae* and the grass tribe *Bambuseae*, etc. suggests that it may have contracted to small areas during periods of extreme aridity (Good, 1964). Much of the Congo basin is covered by the Kalahari sands, which are mainly pre-Pleistocene, although at least two phases of aeolian deposition have been recorded during the upper Pleistocene for the Congo (Cooke, 1964). The low water holding capacity of such sandy soils would mean that any trend towards drier conditions would have a profound effect on the vegetation. Furthermore, during the Pliocene a large lake is believed to have formed in the Congo basin following the downwarping that accompanied the uplift of the East African plateau

(Carcasson, 1964). This too would have had a restrictive effect upon the vegetation.

From a study of dunefields and old lake strandlines of Mega-Chad, Grove & Warren (1968) have concluded that the southern limits of the Sahara have shifted long distances both north and south during the later stages of the Quaternary period. There are indications that the 150 mm isohyet was once some 500 km south of its present position and there is also evidence that the isohyets have also been some hundreds of kilometers to the north of their present positions. The southern limit of the Sahelian Domain more or less corresponds to the southern limit of the distribution of aeolian sand (Fig. 23). In West Africa the dunefields of Grove & Warren have been adjusted so as to conform with the findings of Sombroek & Zonneveld (1971). This Pleistocene sand invasion must have destroyed much of the Tertiary flora and pushed the remainder further south. The poverty of the present-day flora may perhaps be attributed to this cause.

Warren's interpretation of the extent of the Pleistocene sand sheet in Kordofan and Darfur is based mainly on a stereo-interpretation of the aerial photography. It is evident from the field work of my former colleague, F. W. Collier, published in *Hunting Technical Services* (1964), that the sandy topsoils in the Abu Zabad–En Nahud area of Kordofan were formed *in situ* and subjected to very local wind transportation (area 2 in Fig. 23). They are not part of the Pleistocene sand invasion. Furthermore these soils have excellent soil moisture characteristics and are largely covered by deciduous tree species, i.e. it has a Sudanian Domain flora. This amendment helps to strengthen the argument of the close relationship between the Sahelian Domain and the Pleistocene sand invasion. Part of the clay plain of the Nile (area 4 in Fig. 23) has also been included in the Sahel zone; the low moisture penetration and high moisture retaining capacity of these soils are not compensated for by a higher rainfall, which consequently supports a typically Sahelian vegetation.

The Quaternary vegetation of the Sahara has been largely reconstructed by Quézel & Martínez (1958–59, 1962) and Quézel (1960). Pollen analysis of recent Quaternary sediments, correlated with radio carbon dating of related archaeological material, has indicated the existence of less rigorous climatic conditions in the past. These milder conditions permitted a number of species from the Mediterranean to penetrate as far south as the Ahaggar and Tibesti, with a later northward movement of Sahelian species to these same mountains (Fig. 23).

It must not be assumed that the milder climate permitted a widespread vegetation cover across the Sahara. This would have implied a southward shift of the Mediterranean climatic belts by approximately 1000 km, and there is certainly no evidence for such a major climatic shift. A slightly higher rainfall over the Saharan massifs would suffice to create a seasonal flow along the rivers, instead of the present-day sporadic flash floods. The Mediterranean flora and fauna were

able to penetrate the western Sahara along the rivers. Conversely, in the Libyan Desert it is the absence of high ground with its consequential drainage system that has created a migration barrier for biota from the eastern Mediterranean. The effect is admirably illustrated by Sparks & Grove (1961) in their map showing the distribution of Palaeoartic mollusca in the Sahara during the Pleistocene.

Thus Fig. 23, which has been adapted from Quézel & Martinez (1958–59), should be interpreted as showing a penetration of Mediterranean steppe vegetation along the rivers of the lowland, and woodland vegetation in the higher lying areas of the Sahara.

Before 10 000 BP the climate was dry, permitting only a rather sparse flora consisting mainly of grasses and chenopods. This was followed by more humid and temperate conditions which lasted until about 6000 BP. Under such conditions *Quercus ilex* L., *Alnus*, *Tilia*, *Juglans* and *Acer* grew on the mountains, with *Pinus* at the lower altitudes. With increasing temperature and drier conditions, a more xerophytic flora consisting of *Olea*, *Cupressus*, *Celtis*, etc. penetrated the Sahara and *Cedrus*, *Juglans*, *Pistacia* and *Erica* invaded the higher altitudes.

The Mediterranean flora almost entirely disappeared by about 2800 BP and was replaced by species of *Acacia* from the Sahelian zone. The rapid increase in desertification at about 500 BP brought about the isolation of the vegetation on the Saharan massifs. The Mediterranean affinities of the Saharo-montane flora are, according to Quézel (1960), with the Algerian

and Atlas Mountains.

In the Nile valley, Tertiary boreal and montane Mediterranean elements extended as far south as the Kurkur Oasis ($23^{\circ}54'N$, $32^{\circ}19'E$) in Egypt (Van Campo *et al.*, 1968). Further pollen investigations are required regarding the former southward extent of the Mediterranean flora into Libya and Egypt.

In an admirable summary Grove (1973) has written 'The general picture is that over large areas of tropical Africa, especially in lands now semi-arid or sub-humid, we have evidence of a distinctly drier climate than now about 20 000 to 15 000 years ago, a period wetter than now from 12 000 to 7000 BP, possibly a short dry phase lasting a thousand years and then, at least in some areas, one or more phases when the climate was more humid than at present.' To this should be added the conclusions of Zinderen Bakker & Coetzee (1972) that there is evidence from Lakes Victoria, Rudolf, Chad and Afrera indicating a brief dry interlude c. 10 500 BP to 10 000 BP.

2 The Sudan

There is still very little known about the palaeobiology of the Sudan during the Quaternary (see Wickens (1975b) and Wickens in Clark & Williams (1976b) for a survey of the available evidence). The Soil Conservation Committee's report, summarized by Whyte (1951), estimated that at some time during the Quaternary there was a minimum northerly shift of the present-day 200 mm isohyet of about 550 km. This estimate was based on the distribution of Neolithic implements and subfossil shells found scattered over a wide area of the

Fig. 23 Northern tropical Africa during the Pleistocene (adapted from Quézel & Martinez, 1958–59).

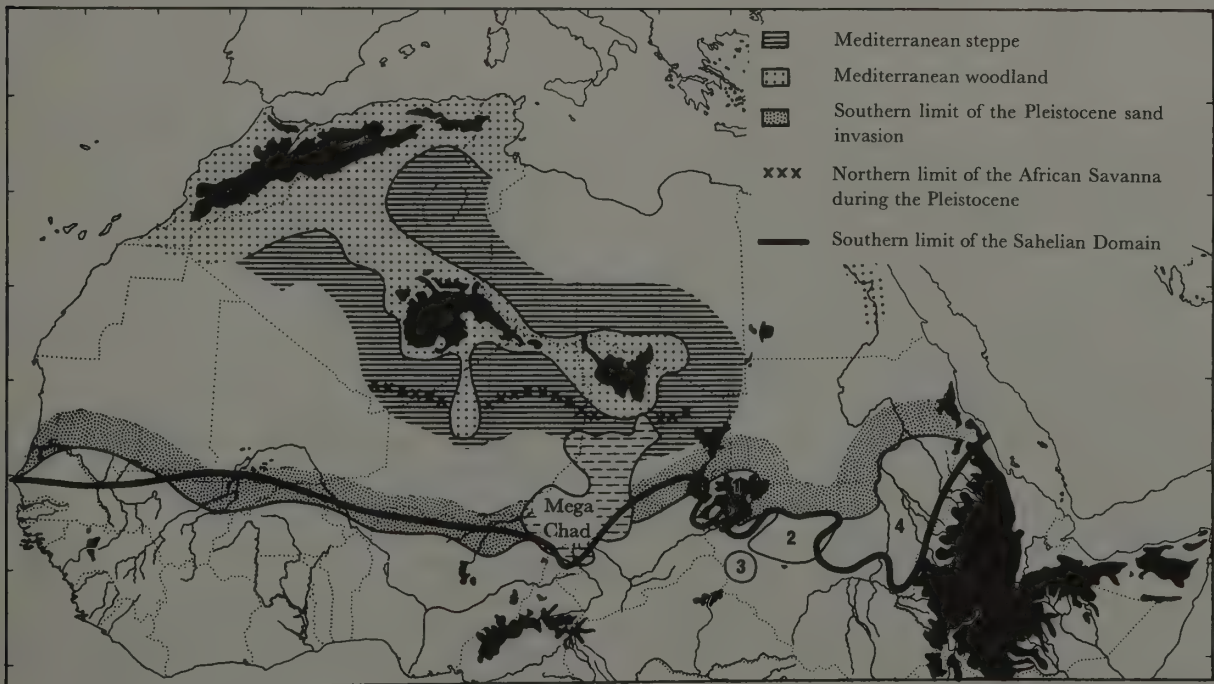


Table 3 Chronology of climatic conditions during the Quaternary

Time BP	Sudan			Sahara	Egypt	East African Mountains	Europe	
	Warren (1970) amend. Kordofan	Berry & Whiteman (1968) Nile Valley	Jackson (1957)	Quézel & Martinez (1958-59)	Butzer (1959) Nile Valley	Coetzee (1967)		
0	Present-day conditions		Present-day conditions	Desert climate; progressive and rapid desertification of the Sahara	Fluctuations around present-day conditions	Cooler	Present	Post Glacial
1000							Sub Atlantic; cool, wet fluctuations	
2000								
			Slightly wetter than present		Arid			
3000	Becoming drier			Sahelian climate; warm and dry.		Progressively warmer, reaching a maximum		
			Dry; northern Darfur abandoned	Invasion of <i>Acacia</i> spp. and disappearance of Mediterranean flora			Sub Boreal; warm but cooler, drier	
4000	-----					c 4000 BP		
	Period IV; wet, rainfall belts 250 km to north of present		Wet; northern Darfur inhabited	Semi-arid Mediterranean climate	Moister than today (Neolithic subpluvial)		Atlantic; warm, wet	
5000		Wet; Neolithic man at Esh Shaheinab						
6000			Rainfall at Khartoum c 500 mm					
	Period III; dry							
7000			Rainfall at Khartoum c 700 mm		Arid, with intensified aeolian activity.			
	Period II; wet, rainfall belts 400 km to north of present			Mediterranean climate; warm and moist.	Probably a brief interruption c 11,000 BP		Boreal; warmer, wet	
8000				Invasion of Mediterranean flora				
9000							Pre-Boreal; cool, wet	
10,000								
			Dry period; ?sand invasion of Kordofan	Cold				
11,000		382 m White Nile Lake				Progressively warmer	Younger Dryas; cold, drier	
		386 m White Nile Lake						
12,000	-----							
	Becoming wetter		Formation of the Gezira plain; rainfall in the Gezira 700 mm or more				Alleröd Interstadial	Late Glacial
13,000							Older Dryas; cold, drier	
							Bölling	
14,000							Interstadial; warm oscillations	
						Mount Kenya hypothermal, temperatures $\pm 5.1-8.8^{\circ}\text{C}$ lower than present. Vegetation belts shifted 1000-1100 m lower down slope		
15,000							Late Würm; cold and dry	
	Period I; very dry, rainfall belts 450 km to south of present							
16,000								
17,000								
18,000								
19,000								
20,000								
							Middle Würm (main phase); very cold and dry	
21,000								

Table 3 Continued

Time BP	Sudan			Sahara	Egypt	East African Mountains	Europe
	Warren (1970) amend. Kordofan	Berry & Whiteman (1968) Nile Valley	Jackson (1957)	Quézel & Martinez (1958-59)	Butzer (1959) Nile Valley	Coetzee (1967)	
22,000							
23,000							
24,000							
25,000		Dry period; Gezira clays deposited					
26,000							
27,000							
28,000							Paudorf Interstadial; warm oscillations
29,000						Kalambo Interstadial. Temperatures 2.0-4.1°C lower than present	
30,000							
31,000							Middle Würm (early phase); very cold and dry
32,000							
33,000							

Libyan Desert. Actually Neolithic man had mainly settled along the natural drainage lines within the desert, where conditions would have been most favourable.

Even today the Wadi Howar in northern Darfur has sufficient water and vegetation to support, at least for some months of the year, such animals as oryx, addax, ril, gazelle, giraffe, ostrich, hyaena, jackal, fox, red hussar monkey, antbear, porcupine, lion and hunting dog (Shaw, 1936).

Jackson (1957), in an admirable summary of the then available archaeological and historical data, suggests that 100 mm would be the minimum for habitation away from oases and rivers. The Conservation Committee have obviously underestimated the significant response that can be obtained from quite small increases in precipitation. A northerly shift of the 200 mm isohyet by approximately 250 km would include the Wadi Howar area and even be sufficient to support life away from the natural drainage lines.

Today permanent settlements with cultivation under similar rainfall conditions exist in northern Kordofan.

Warren (1970) from his studies into the distribution of dune systems of Kordofan in relation to sand-moving wind directions, was able to postulate a sequence of shifts in the wind and rainfall belts. No radiocarbon dates were provided and the shifts were loosely related to the now outdated chronology of Grove & Warren (1968) for West Africa. Although Warren's calculations indicated southerly shifts in the climate and vegetation belts of 450 and 200 km, no estimates of the northerly shifts were possible. The four climatic sequences recognized by Warren are here related to the revised general chronology recognized by Grove (1973). See table 3.

Period I represents a very arid phase during which both wind and rainfall belts were some 450 km to the south of their present position. Warren believes that the sands were in movement as far south as 10°N, in the region of the little known Qozes Salsilgo and Dango (Fig. 23, area 3) to the south of Jebel Marra. According

to D. Parry (verbal information, 1972) who has recently carried out a soil survey in an area that included a portion of the Qoz Dango, the sands are probably of local origin and represent locally reworked fluvial and fan deposits. This period can be related to the dry period of Grove (1973) from 20 000 to 15 000 BP. The fossil assemblage of Singa and Abu Hugar by the Blue Nile (Bate, 1951) would also appear to belong to the period, for which Berry & Whiteman (1960) have given a possible radiocarbon date of $17\,300 \pm 200$ BP (the material sampled may have been contaminated by younger radiocarbon). Berry & Whiteman also suggest that the Gezira clays were deposited during the period, when due to the reduced rainfall, the Nile was unable to sweep away its sediment load. The recent work of Williams & Adamson (1973, 1974), however, suggests that the Gezira clays were deposited during the following wet phase and that the White Nile was reduced to a seasonal trickle during this dry period.

Warren's Period II was a very wet phase from about 12 000 to 7000 BP. An estimated northerly shift of about 400 km is considered the minimum necessary to account for the known changes in the flora and fauna of northern and central Sudan during this period (Wickens, 1975b). This estimation takes into consideration the former presence of *Elaeis guineensis* Jacq. on the Jebel Marra massif, the evidence for which is based on leaf impressions recovered from the southern piedmont (p. 9). The nearest known present-day locality for this palm is from just across the border into the Central African Republic, some 600 km to the south (Wickens, 1975a & c).

Warren suggests a possible correlation with the former White Nile Lake. Berry & Whiteman refute, on both hydrological and geomorphological grounds the possibility of the existence of the much larger 'Lake Sudd', whose existence had been postulated by Lawson (1927) and other hydrologists. They accept the evidence of beach terraces at 386 and 382 m ASL for the former presence of the White Nile Lake. At the upper level the lake would have been up to 40 km wide, at the lower level about 20 km. Southwards the lake must have stretched from between 650 and 500 km. Radiocarbon dates from gastropod shells from the lower lake give dates of $11\,300 \pm 400$ BP and 8730 ± 400 BP and 8730 ± 350 BP (Williams, 1966). A hypothetical reconstruction of the broad vegetation zones at this period is given (Fig. 24). In addition to the climatic factor, the soils have also been taken into consideration, with particular reference to the works of Worrall (1957), Lebon (1961) and Hunting Technical Services (1964).

Smith (1949) has ably demonstrated the relationship between the vegetation and soil moisture; a species growing on sandy soils requires 2x mm annual rainfall and the same species on clay soils requires 3x mm. This is yet another factor that has to be taken into consideration for the reconstruction.

A more intuitive approach is needed regarding the effectiveness of the increased rainfall. Even a slight

increase (or decrease) is likely to produce a spectacular effect in the lower rainfall areas. This is evident from the dense cover of ephemeral herbs and grasses that spring up after the rare rain showers in the desert area of Darfur and Chad, the famous 'gizzu' grazing (Harrison & Jackson, 1958). In the higher rainfall areas quite large increases are necessary before there will be any noticeable effect on the vegetation. The calculations of Warren (1970) were based on his work on the sand dune areas of northern and central Sudan and may not be applicable to southern Sudan, for which there are no data available on Pleistocene conditions. The reconstruction of the vegetation zones assumes a parallel shifting of the climatic and vegetation zones throughout the Sudan. The validity of such an assumption is strengthened by the indications that the present drought to the south of the Sahara is due to a southward parallel movement of the isohyets by about 100 km.

It is also assumed that the vegetation changes would at first lag behind the alterations in climate. With increasing aridity many deep rooted species would tend to hang on until the underground water table could no longer be reached; conversely, with increasing rainfall, colonization would be delayed because of the time required for suitable habitats to develop and suitable seeds to become available. The map consequently represents an arbitrary decision as to the period (c. 9000 BP) when the vegetation might have reached its maximum development.

The resulting map should be compared with that of the present day vegetation (Fig. 6). The increase in the 'Flood Region' during the wet phase of the Pleistocene corresponds to the extent of soils of the clay plain. The area is undoubtedly exaggerated since the deposition of alluvium is still taking place today. It must not be assumed that 'sudd' ⁽¹⁾ and 'toich' ⁽²⁾ conditions were necessarily prevalent throughout the entire region. Indeed it is difficult to imagine what conditions must have been like although it is presumed that varying degrees of seasonal inundation were likely over much of the area, as in the Baggara and Raqaba catenas of Harrison & Jackson (1958) today.

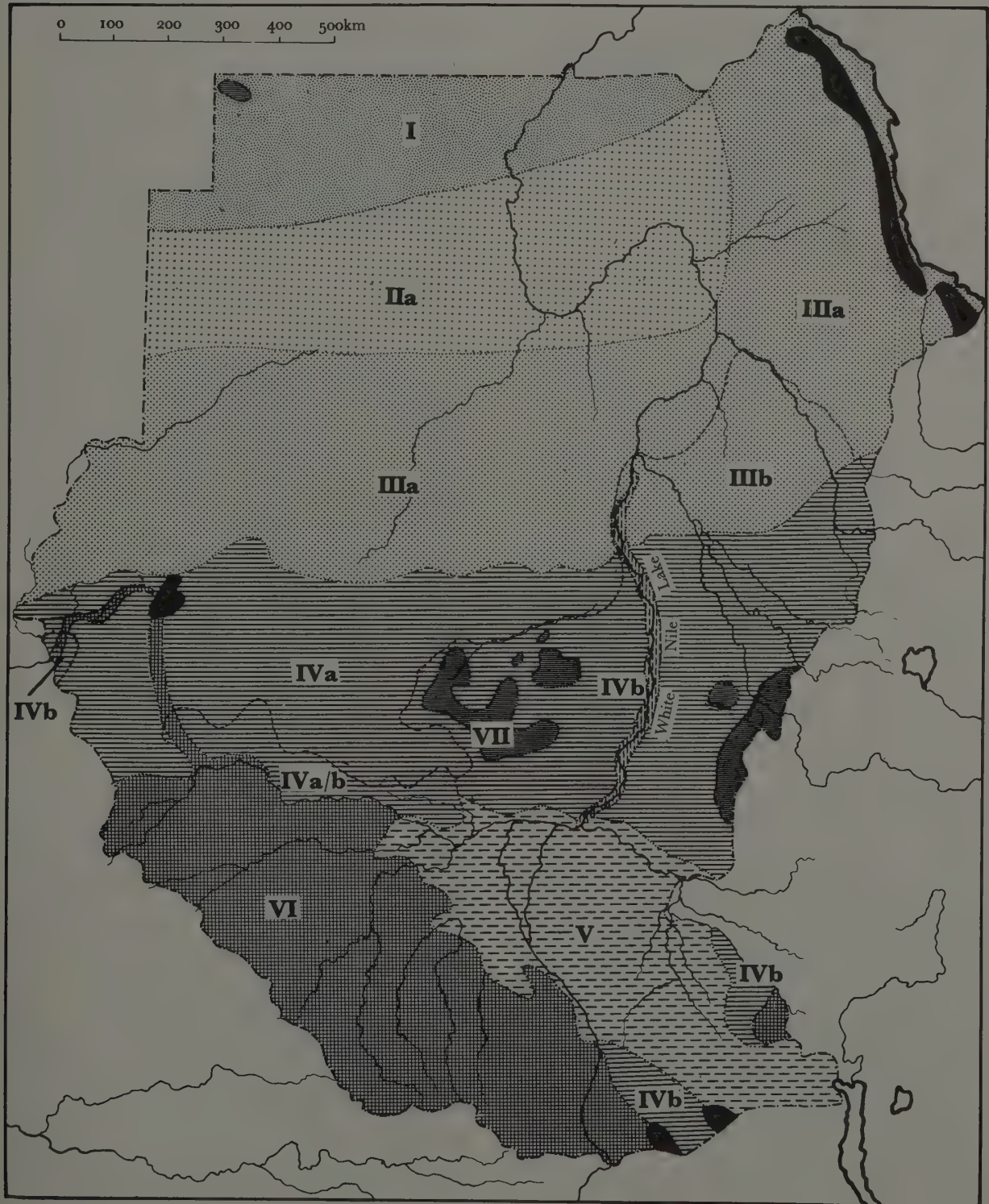
Riparian woodland or forest may have bordered the major waterways, as in the upper reaches of the Bahr el Arab today, possibly far more prevalent than indicated. Indeed, much of this speculation is based on impressions obtained from a visit to southern Darfur by the writer during April and May 1971. Riparian vegetation could have acted as a migration route (see footnote p. 23) to Jebel Marra, for such exotic species as *Trema orientalis* (L.) Blume, *Casearia barteri* Masters and *Polyscias fulva* (Hiern) Harms, now to be found in the gallery forests of Jebel Marra as well as the former presence of *Elaeis guineensis* Jacq. The migration route could have been via the Wadi Azum, for the present

(1) 'sudd'—the vast *Cyperus papyrus* swamp blocking the White Nile between Lake No and Bor. From the Arabic *sadd*, a barrier.

(2) 'toich'—the annually flooded grazing lands along the watercourses draining into the 'sudd'. A Dinka word.

Fig. 24 Hypothetical reconstruction of the vegetation regions of the Sudan c. 10 000 BP

- | | | | |
|-----|---------------------------------|------|----------------------------|
| I | Desert | iv | Deciduous savanna woodland |
| II | Semi-desert scrub and grassland | a | on latosols |
| | a-on lithosols | b | on clay soils |
| | b-on clays soils | v | Flood region |
| III | Thorn savanna and scrub | a | swamp and wetland savanna |
| a | on sandy soils | b | grassland |
| b | on clay soils | vi | Lowland forest |
| | | vii | Hill vegetation |
| | | viii | Montane vegetation |



day 700 mm isohyet (Fig. 5) produces a distinct salient towards the massif. An estimated increase of 300 to 400 mm in rainfall would suffice for an effective but not necessarily continuous migration route to be formed (see Wickens 1976a for further discussion). Another connection with Jebel Marra through the Bahr el Arab by way of the Wadi Bulbul may also have been possible at this time, suggested by the presence along the Wadi Ibra, south of Nyala, of *Hexalobus monopetalus* (A. Rich.) Engler & Diels, a tree previously only recorded in the Sudan from Equatoria Province, among other riverine species such as *Anogeissus leiocarpus* (DC.) Guill. & Perr., etc.

The Red Sea Hills and the Nuba Mountains were probably better afforested. The former almost certainly acted as a migration route between the Mediterranean and Ethiopia. The evidence for this lies in the distribution pattern of a number of Afro-montane taxa of Boreal affinity. There is less evidence available for the Nuba Mountains; the area is densely populated with extensive terracing of the hill slopes and much of the vegetation has now been destroyed. There is an interesting northern outlier, Jebel Ed Dair, which appears to have escaped the full force of man's activities, but unfortunately has not yet been visited by a botanist during the rainy season (access is difficult during the rains). A brief description of the vegetation during the dry season is given by the writer in Hunting Technical Services (1964). A collection during the rains could perhaps provide some evidence to support the hypothesis that the Nuba Mountains could have acted as a staging post for the migration of taxa between Ethiopia and Jebel Marra. It is difficult to envisage how species from the Ethiopian highlands could have crossed the 1200 km wide interval except by long-distance dispersal (Wickens, 1976a). Coetzee & Zinderen Bakker (1970) suggest that the migration route between the East African highlands and Jebel Marra could have been along the Nile-Congo and Nile-Chad divides, but the high ground along this route would have been too low for the obligate high altitude species (Wickens 1976a).

It is assumed that the Boreal element must have reached Jebel Marra during this period, or perhaps during an even earlier wet period. On the assumption that Warren is correct, the more recent climatic conditions would have been too dry for this to have occurred.

Period III represents a dry phase, but not as dry as Period I. According to Warren there was a southward shift of over 200 km in both wind and rainfall belts, followed by a northwards retreat of the wind pattern, during which the vegetation was slow to colonize the high sand dunes. This is provisionally dated from about 7000 to 6000 BP, although there is as yet no carbon dating or biological evidence that can be attributed to this period, and it may be that this dune formation should be referred to the end of Period I!

Period IV was a wet phase, although less wet than Period II; the shift of the climatic and vegetation belts being approximately 250 km north of their present position (Wickens, 1975b). Warren suggests that this may correspond to the wet period in Chad which has been dated at about 5400 BP, as well as with the high levels in the flow of the Nile. Berry & Whiteman (1968) give an average radiocarbon date of 5253 ± 415 BP for a Neolithic site at Esh Shaheinab, 50 km to the north of Khartoum.

The calcareous swamp and lake deposits found in the interdune hollows associated with the particular dune formation (High Qoz) in Kordofan, may also belong to this wet phase. The fossil *Phragmites* sp. collected by my colleagues, Messrs D. O. Hughes, F. W. Collier and myself from Mazrub is from such a deposit (Hunting Technical Services, 1964). Pollen associated with the fossil was only identified as belonging to the Chenopodiaceae. Similar calcareous deposits at Mazrub, En Nahud and from near Umm Dam should be further investigated.

Fossil plant material erroneously reported by Colchester (1927) as *Cyperus papyrus* L. has been obtained from the Malha Crater, some 330 km to the north-east of Jebel Marra. The material is in the British Museum (Natural History) and on examination proved to be *Phragmites* sp. Nearby Dr L. Clark (1971, personal communication) has observed a recent limestone bench with shells, lying to the north-west of the Wadi Mareiq wateryard. Dating of these records would be of considerable interest and greatly assist in our understanding of the Pleistocene period in the Sudan.

The results of Warren's interpretation of the palaeoclimate chronology for the Sudan are shown in Table 3, together with the findings of other workers in the Sudan, Egypt, Tibesti and East Africa.

Chapter 12

An analysis of the savanna flora of the Jebel Marra survey area

The objective of this phytogeographical study is to try to understand how the flora of the Jebel Marra massif originated and its relationship, if any, with the flora of the surrounding savanna.

All the angiosperm taxa recorded from within the survey area are enumerated in Appendix C. The broad ecological zones in which these taxa occur, namely upland grassland, gallery forest, hill savanna, piedmont savanna and lowland savanna, are scored, and the phytogeographical categories noted. Appendix D is a compilation of the phytogeographical data presented in Appendix C, and is summarized in Table 4 (page 62).

The figures summarized in Table 4 are more or less self-explanatory. The Guineo-Congo element would be expected to be absent from the upland grassland since forest and montane grassland are not compatible; it is, as expected, best represented in the gallery forest (see Chapter 7 for the definition of a gallery forest). The xerophytic flora of the Saharo-Sindian liaison element would certainly not be expected in the gallery forest. The numerically poor flora of the gallery forest is probably due more to insufficient collecting than to distance from the forests of the south. The small area and time are other factors affecting the size of this particular flora.

The cosmopolitan element, represented chiefly by ruderal taxa, is twice as numerous on the massif and piedmont compared with the lowland plain. This is probably a reflection on the higher human activity and more mesophytic conditions of the massif and piedmont.

It is also apparent from a study of these tables that the flora of the upland grassland differs markedly from the rest of the area because of the low percentage of the Sudano-Zambezian element present and the increase in the Afro-montane and Boreal elements. (It should be noted that the Afro-montane element present in the hill savanna and piedmont floras can mainly be attributed to species requiring fairly moist habitats that have been dispersed lower down the mountain-side; others may be termed 'sub-montane' and are consequently difficult to categorize.) The floras of the remainder of the area are relatively uniform in percentage composition and consequently may be regarded as a single unit for the purposes of historical analysis.

There are 106 taxa whose pan-African distribution is more or less restricted to mountains and uplands. The historical factors involved in their distribution may

not necessarily be the same as, or contemporaneous with, those that have affected the distribution of the flora of the lowland savanna. Consequently, their phytogeographical analysis is dealt with separately in Chapter 13.

Before dealing further with the analysis of the savanna flora it is first necessary to establish whether the vegetation within the area of the Sahelian and Sudanian Domains is floristically uniform from east to west, or whether the eastern half is richer or poorer than the western.

White (1965) has adequately demonstrated that the savanna flora of West Africa is poorer in tree species than that of Zambia. For the purposes of this study White's data (with additions from Keay *et al.* (1960–64) and the Flora of West Tropical Africa) for savanna tree species known to reach a height of 5 m occurring in Nigeria and the Niger Republic is compared with those recorded by Andrews (1950–56) for the Sudan Republic. The trees are listed in Appendix E.

The two areas are of approximately similar size and cover a similar range of vegetation types (Nigeria + Niger 845,860 square miles; Sudan 967,500 square miles). According to White there are very few tree species in West Africa that do not occur in Nigeria, hence the slight differences in area is unlikely to be significant. A comparative analysis of the two areas is given in Table 5.

Table 5 A comparison of the savanna trees of Nigeria + Niger and the Sudan

	No.	%
Species common to Nigeria + Niger and Sudan	149	58.2
Species present in Nigeria + Niger only	36	14.1
Species present in Sudan only	71	27.7
	256	100

From the table it is apparent that the Sudan with 220 species has a slightly richer tree flora than Nigeria plus Niger with only 185 species. With only 58.2 per cent of the species in common it is obvious that the savanna is not as uniform as was originally believed.

Williams (1947) has suggested a correction for differences in size of the areas, calculating that T, the theoretical number of species in common between two floras drawn from a common source will have the following relationship:

$$T - a = a \log_e \frac{(A + B)}{A} \text{ and } T - b = a \log_e \frac{(A + B)}{B}$$

Table 4 A summary of the phytogeographical analysis of the flora of Jebel Marra and the surrounding lowland

Floristic Category	Total area Surveyed		Jebel Marra Massif										Lowland Plain	
			Massif + Piedmont		Upland Grassland		Gallery Forest		Hill Savanna		Piedmont Plain			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Cosmopolitan	28	3.1	27	3.7	13	6.0	1	2.1	21	4.7	19	4.9	8	1.8
Palaearctic	8	0.9	8	1.1	7	3.2	—	—	4	0.9	2	0.5	1	0.2
Pantropical	88	9.8	59	8.1	7	3.2	3	6.2	43	9.9	41	10.5	67	15.3
Palaeotropical	98	10.9	75	10.3	17	7.8	5	10.4	43	9.9	39	10.0	59	13.5
Sudano-Zambezian	492	55.0	390	53.8	67	30.7	31	64.6	263	58.9	243	69.4	263	60.1
Guineo-Congo	15	1.7	12	1.7	—	—	4	8.3	6	1.3	3	0.8	7	1.6
Saharo-Sindian + Sudano-Zambezian	51	5.7	41	5.6	10	4.6	—	—	28	6.3	25	6.4	28	6.4
Boreal	17	1.9	16	2.2	12	5.5	—	—	6	1.3	4	1.0	2	0.5
Afro-Montane	89	9.9	88	12.1	78	35.8	3	6.2	28	6.3	11	2.8	—	—
Endemic	11	1.2	10	1.4	7	3.2	1	2.1	4	0.9	3	0.8	2	0.5
Total	897	100.1	726	100.0	218	100.0	48	99.9	446	100.4	390	100.1	437	99.9

where A and B are the areas bearing a and b species respectively, and α is the index of diversity. Unfortunately, if the areas are too close in size the calculation cannot be made (see Greig-Smith, 1964, and Exell & Wild, 1961 & 1973 for further discussion regarding the use of William's quotient of affinity). If the calculation is made for Nigeria only, with 183 species and 356,700 square miles, then 172 species, or 94 percent of the flora would be expected to be in common with the Sudan. Such a high percentage is difficult to accept. The calculation assumes a uniform distribution of taxa irrespective of dispersal mechanisms and distance between the two areas. In my opinion a figure of around 70 percent would be more realistic. The actual

figure of 58.2 percent is low and would suggest that the two floras have not been derived from a common source. This is supported by an analysis of the distribution of the 71 species not found in West Africa, but present in the Sudan. Of these, 16 extend into Zambia and the majority of the remainder occur in Ethiopia and/or East Africa. The obvious conclusion is that the flora of the Sudan has been enriched by an infiltration of species from eastern Africa which have not penetrated into West Africa. The large disparity between the actual and estimated differences is suggestive that there may also have been some barrier to a free east-west migration of species.

This hypothesis can now be examined in relation to

the Jebel Marra savanna flora. An examination of the check list (page 83) shows that there are 81 taxa that are not recorded elsewhere in the Sudan. A breakdown of the phytogeographical affinities of these taxa is shown in Table 6.

Table 6 Phytogeographical analysis of species not recorded elsewhere in the Sudan

Floristic category	No. of spp.	%
Aforiental – Zambezan Domains	30	37
Aforiental Domain	4	5
Zambezan Domain	4	5
Sudano-Zambezan Region	18	22
Western Sudanian Domain	8	10
Miscellaneous	17	21
	81	100

No less than 47 percent of the species are from the eastern side of the Sudano-Zambezan Region, thus supporting the original hypothesis of an infiltration into the Sudan from the east.

The analysis given in Appendix D shows that there are 19 taxa whose distribution lies in the eastern part of the Sudano-Zambezan Region, i.e., although represented in the Sudanian Domain, their distribution does not extend as far west as Nigeria. The figures are in fact an underestimation, for an examination of the distribution maps shows that there are a number of taxa which theoretically have an omni-Sudano-Zambezan distribution but are weakly represented in West Africa and have their main centre of distribution in eastern Africa. The same applies for more widespread taxa with a Palaeotropical or even Pan-tropical distribution, which although well represented in East Africa, are poorly represented or absent from West Africa. There are a further 9 taxa belonging to the Sahelian Domain and 15 from the Sudanian Domain whose distribution is confined to the eastern half of their domains. Only 8 species belonging to the western half of the Sudanian Domain extend as far to the east as Jebel Marra.

The distribution of woody plants in the savanna regions of Africa is largely governed by soil moisture conditions (Smith, 1949; Hunting Technical Services, 1964). It is difficult to formulate such a generalization for herbaceous plants since their response to soil moisture is complicated by the differences in the micro-environment. There is certainly no recorded ecological evidence for explaining why the Sudanian (and Sahelian) Domain should not be uniformly populated throughout its breadth. It must therefore be concluded that there is, or has been, a physical barrier preventing a free east–west migration of plants, to account for the floristic differences between the east and west.

The Nile-Chad divide is a natural watershed that includes the Jebel Marra massif and lies half way across the continent of Africa (Fig. 1). It could be expected that if the divide was acting as a barrier to plant movement, the two halves of the flora would be more-or-less equally represented in the Jebel Marra

area. This is certainly not the case since the eastern half of the flora is much better represented. From this it can be inferred that the barrier must lie further to the west.

Clayton (1969), from his studies of the genus *Hyparrhenia*, has suggested that the Sudanian Domain can be divided into eastern and western halves along a line imposed by the mountain range of the Cameroons and the Lake Chad depression (Mega Chad). In Chapter II it is noted that during a severe arid phase of the Pleistocene the northern savannas of Africa were pushed southwards when an aeolian sand invasion covered an area which today more or less corresponds to the Sahelian Domain (Fig. 23). This arid phase was followed by a wet phase during which a large lake, Mega Chad, occupied the present-day depression between Lake Chad and Tibesti. Such a vast lake would have formed an insuperable barrier for an east to west movement of quite a number of taxa (Moreau, 1963).

The new ecological requirements imposed by sandy soils of low water holding capacities must have made colonization of the Sahel zone extremely difficult. The area to the west of Mega Chad would have had to rely mainly on suitable relic species from the original savanna. To the east of Mega Chad there appears to have been an influx of species from eastern Africa and perhaps from even further afield, from India.

Very little is known at present about the southern fringe of Arabia. At some stage it must have provided a pathway to the Indian subcontinent, permitting the migration of such species as *Balanites aegyptiaca* (L.) Del., *Grewia bicolor* Juss., *G. tenax* (Forsk.) Fiori, *G. villosa* Willd., *G. flavescent* Juss., etc. Many of these species remain taxonomically indistinguishable throughout their distribution range, while others, such as *Acacia nilotica* (L.) Willd. ex Del., *A. polyacantha* Willd., *Albizia amara* (Roxb.) Boiv., etc. can be distinguished at the subspecific level for their Indian and African distributions.

Zohary (1962) suggests that the Sudano-Zambezan relic element in the flora of Israel, consisting of such species as *Acacia albida* Del., *A. tortilis* (Forsk.) Hayne, *Balanites aegyptiaca* (L.) Del., *Maerua crassifolia* Forsk., etc. are part of an African savanna flora that made its appearance during the Miocene. The Miocene is considered as being climatically the most favourable period for the occurrence of such a flora in Israel. The deserts of Arabia and the Sahara would have severely hindered such a migration in post-Miocene periods.

By analogy, the southern Arabian pathway must have been open during the Miocene, possibly earlier, for the separation of Arabia from Africa by the Red Sea rift did not take place until the Upper Miocene–Lower Pliocene (Moreau, 1952; Schnell, 1962). This old Miocene flora appears to be fairly widely dispersed throughout the Sudano-Zambezan Region although some species have a more limited range, such as *Cometes abyssinica* R.Br. which is more or less confined to the vicinity of the Red Sea.

White (1965) has commented on the low degree of endemism amongst the savanna tree flora of West Africa. The same is also true of the Sudan, *Combretum hartmannianum* Schweinf. and *Albizia aylmeri* Hutch. are among the few tree endemics, *Antheophora lynesii* Stapf & Hubbard, *Cymbopogon sennarensis* (Hochst.) Chiov. and *Hyparrhenia confinis* (Hochst. ex A. Rich.) Anderss. ex Stapf are among the endemic grasses.

White has also pointed out the wide latitudinal range of the majority of the savanna trees, extending through a number of ecological zones. Smith (1949) had already

demonstrated this fact for the Sudan and shown how the distribution of trees is correlated with soil moisture conditions. It is this wide tolerance of compensatory soil moisture conditions over extensive latitudinal range that is suggested as being the reason for the low degree of endemism present in the Sudanian and the Sahelian Domains. Smith's work was unfortunately published in a minor Sudan government publication and consequently has not received the wide acknowledgement it deserves.

Chapter 13

An analysis of the Jebel Marra montane and temperate elements

The floras of the individual mountains within the Afro-montane Region consist of assemblages of floristic elements of mixed derivation. The analysis of such an assemblage can present certain difficulties in that the data is either too bulky or complex to be handled by simple visual inspection. Fortunately, individual montane floras can be conveniently regarded as being analogous to island floras in that they are self-contained unit areas which are dispersed over a continent instead of an ocean. They are suitable for arithmetic treatment using a computer.

From a rather cursory examination of recent literature it would appear that the computer handling of distributional data for phytogeographical purposes has been pioneered by the zoologists, as can be seen from the papers of Holloway & Jardine (1968), Holloway (1969, 1970); I am not aware of comparable phytogeographical studies apart from those of my colleagues, Clayton & Hepper (1974), Clayton & Panigrahi (1974) and Clayton (1976).

It is not necessary to understand fully the complex mathematics involved in order to process data through a computer, provided a correct program has been provided and its failings appreciated. By using a suitable similarity coefficient it should be possible to divide a flora into its component floristic units by simply calculating, with the aid of a computer, the areas in common for each pair of species.

This analysis is of 106 taxa of montane or highland distribution in Africa, either autochthonous or of Boreal origin and often with only sporadic occurrences in tropical Africa. The concept of what constitutes a montane species is not easily defined. Not only is the altitudinal variation in vegetation zones inversely proportional to the latitude (see Bougey, 1965, for further discussion), it is also proportional to the distance rain-bearing winds have to travel over land. Species such as *Arenaria leptoclados* (Reichenb.) Juss. that occur at high altitudes on Jebel Marra can also be found at lower altitudes in the Red Sea Hills. The Red Sea Hills are appreciably lower, Jebel Sela, the highest peak on the Erkowit Plateau rises to only 1273 m compared with the 3042 m for Jebel Marra. The climate of Erkowit is modified by the proximity of the Red Sea, thus ensuring rain or dew for most months of the year (Kassas, 1956). The situation is also complicated by what Backhuys (1968) describes as the elevation effect, which he defines as the phenomenon whereby mountain plants occur only on mountains which attain a certain minimum altitude peculiar to the species, and

they are generally able to descend below this critical altitude on the higher mountains, i.e., they descend below the zone of permanent establishment because there is a constant upper source of supply for the descending diaspores.

Ranunculus multifidus Forsk. is an example of a species whose altitudinal distribution appears to descend with increasing latitude for it occurs as high as 3600 m in Kenya, yet in South Africa it may be found at around sea level. Its main distribution in East Africa appears to be below 2000 m, in lowland communities provided moist soil conditions are available. It is not dependent on a high altitude core distribution for its survival, consequently it is not regarded as being a member of the Afro-montane flora. By contrast, a species such as *Gastroidium phleoides* (Nees & Meyen) C.E. Hubbard, which normally occurs in the lowland plains of the Mediterranean, is only found in the uplands of tropical Africa and is therefore regarded as being a member of the Afro-montane flora. The selection of the montane elements in a flora is, therefore, to some extent, subjective.

An approximation of the distribution patterns of the montane element was obtained from an examination of the distribution maps of the individual taxa. The result was exceedingly complex and difficult to comprehend (see Appendix D). It was therefore decided to attempt an analysis of the same data by computer and to compare the results. By visual inspection the total distribution area of the 106 taxa was divided into 38 primary areas (Fig. 25), the maximum that could be filed on the available centre-punched card, using one card per taxon. As can be seen from the map, the mountains of Ethiopia are treated as a single unit, similarly much of the East African mountains. This does mean that undue weighting is given to certain natural extensions of the major areas, e.g. for the Ethiopian mountains, the Red Sea Hills and the Al Range, a fact that was evident in the resulting dendrograms. It must be borne in mind that the present analysis is to determine the geographical relationship of the Jebel Marra flora with other montane floras; the program is not designed to sort out the inter-relationships of the other mountains, nor to verify the existence of the Gillett Line in Ethiopia (see p. 69), etc., such investigations would require a different presentation of data for analysis.

A data matrix was prepared for the 106 taxa and 38 primary areas, scoring for presence only (Table 7). The data used for the scoring was taken from the

Fig 25 Map of primary areas

Key

- | | | | |
|--------------------------|----------------------------------|--------------------------------|-------------------|
| 1 Jebel Marra | 11 Southern Tanzanian Highlands | 21 Ahaggar | 32 Himalayan |
| 2 Sinai peninsula | 12 Mlanje | 22 South-western Mediterranean | 33 Central Europe |
| 3 Red Sea Hills | 13 Rhodesia/Mozambique Highlands | 23 South Central Mediterranean | 34 Sind |
| 4 Yemen Hills | 14 Basuto Highlands | 24 South-eastern Mediterranean | 35 Deccan |
| 5 Ethiopian Highlands | 15 Bié Plateau | 25 Orient | 36 Central Asia |
| 6 Somali Hills | 16 Cameroon Mountains | 26 North-western Mediterranean | 37 Palaeo-Boreal |
| 7 Imatongs | 17 Bornu Plateau | 27 North Central Mediterranean | 38 Pan-temperate |
| 8 East African Highlands | 18 Guinean Highlands | 28 North-eastern Mediterranean | |
| 9 East Congo Mountains | 19 Nuba Mountains | 29 Irano-Anatolian | |
| 10 Usambara Mountains | 20 Tibesti | 30 Mesopotamian | |
| | | 31 Madagascar | |

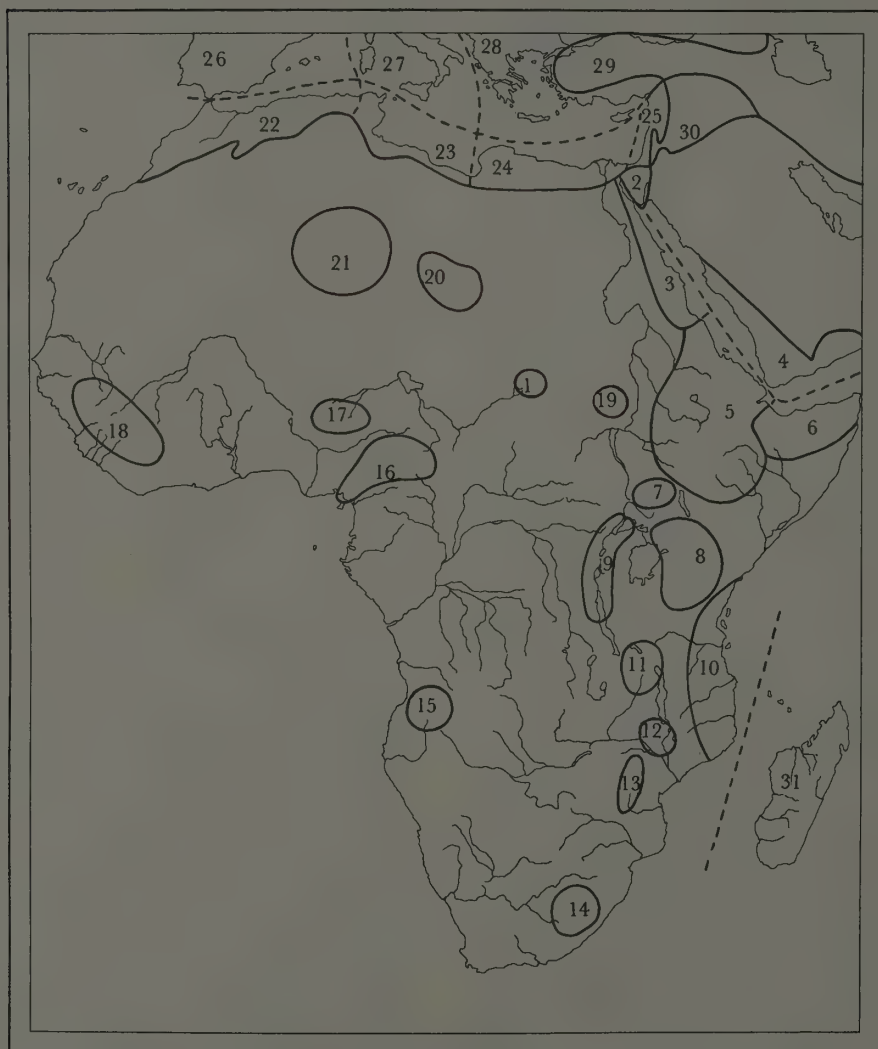


Table 7 Distribution of species by primary areas

Species	Primary Areas
27 <i>Capsella bursa-pastoris</i>	1, 4, 5, 7, 8, 9, 10, 11, 13, 14, 22, 23, 24, 25, 26, 27, 28, 29, 30, 38
34 <i>Polygala abyssinica</i>	1, 3, 4, 5, 6, 7, 8, 32
39 <i>Crassula pentandra</i>	1, 3, 4, 5, 8, 11, 12, 13, 15
43 <i>Umbilicus botryoides</i>	1, 3, 5, 6, 8, 9, 11, 16
46 <i>Arenaria leptoclados</i>	1, 3, 5, 25, 26, 27, 28, 29, 30, 38
47 <i>Cerastium fontanum</i>	1, 26, 27, 28, 29, 38
48 <i>Cerastium octandrum</i>	1, 3, 5, 7, 8, 9, 11, 16
50 <i>Minuartia filifolia</i>	1, 4, 5, 6, 8
53 <i>Silene burchellii</i>	1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15
54 <i>Silene lynesii</i>	1, 20, 21
55 <i>Silene macrosolen</i>	1, 5, 8
67 <i>Rumex bequaertii</i>	1, 5, 7, 8, 9, 10, 11, 12, 13, 14, 16, 31
68 <i>Cometes abyssinica</i>	1, 2, 3, 4, 5
86 <i>Linum strictum</i> ssp. <i>corymbosum</i>	1, 3, 5, 25, 26, 27, 28, 29, 30
88 <i>Erodium malacoides</i>	1, 3, 4, 6, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
89 <i>Geranium ocellatum</i>	1, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 16
102 <i>Woodfordia uniflora</i>	1, 4, 5, 8, 16, 17, 19
126 <i>Zehneria minutiflora</i>	1, 5, 8, 9, 11, 13, 16
141 <i>Hypericum perforatum</i>	1, 22, 23, 25, 26, 27, 28, 29, 33
178 <i>Andrachne aspera</i>	1, 2, 3, 4, 5, 19, 22, 24, 29, 30, 34
242 <i>Argyrolobium arabicum</i>	1, 3, 4, 5, 20, 22
243 <i>Astragalus atropilosulus</i> ssp. <i>abyssinicus</i>	1, 4, 5
244 <i>Biserrula pelecinus</i> ssp. <i>leiocarpa</i>	1, 5, 8
284 <i>Lotononis platycarpus</i>	1, 3, 4, 6, 8, 13, 14, 20, 21, 22, 25, 34
298 <i>Vermifrux abyssinica</i>	1, 4, 5
313 <i>Ficus palmata</i>	1, 2, 4, 5, 34
316 <i>Ficus sur</i>	1, 4, 5
321 <i>Parietaria debilis</i>	1, 3, 5, 8, 9, 14, 16, 20, 26, 27, 28, 32
339 <i>Cyphostemma sesquipedalis</i>	1, 5, 8, 10
362 <i>Polyscias fulva</i>	1, 5, 7, 8, 9, 10, 11, 12, 13, 16, 18
364 <i>Berula erecta</i>	1, 5, 8, 9, 10, 14, 25, 28, 29, 38
365 <i>Caucalis melananthera</i>	1, 5, 8, 9, 10, 11, 14, 16, 31
368 <i>Diplophium africanum</i>	1, 5, 7, 8, 9, 16, 17, 18
369 <i>Ferula communis</i>	1, 3, 5, 6, 8, 11, 22, 25, 26, 27, 28, 33
373 <i>Torilis arvensis</i>	1, 3, 4, 5, 6, 8, 9, 10, 11, 14, 16, 22, 24, 25, 26, 27, 28, 29, 33
374 <i>Blaeria spicata</i> subsp. <i>spicata</i>	1, 5
381 <i>Olea laperrinei</i>	1, 21
396 <i>Anthospermum pachyrrhizum</i>	1, 5
402 <i>Galium thunbergianum</i>	1, 5, 8, 9, 11, 12, 14, 16
412 <i>Oldenlandia echinulosa</i>	1, 8, 9, 11, 12, 13, 15, 16, 17, 18
427 <i>Bidens chaetodonta</i>	1, 5
429 <i>Bidens prestinaria</i>	1, 5, 7, 19
436 <i>Conyza pyrrhopappa</i>	1, 4, 5, 7, 8, 9, 11, 12, 15, 16, 17
437 <i>Conyza schimperi</i>	1, 5
441 <i>Crepis rueppellii</i>	1, 5, 6, 7, 8, 9
444 <i>Echinops boranensis</i>	1, 3, 4, 5, 6
445 <i>Echinops longifolius</i>	1, 5, 7, 8, 9, 16, 17, 18
446 <i>Echinops macrochaetus</i>	1, 3, 5
449 <i>Felicia dentata</i> ⁽¹⁾	1, 5
454 <i>Gnaphalium undulatum</i>	1, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 31
455 <i>Gnaphalium schultzei</i>	1, 5, 7, 8, 9, 10, 11, 15, 16
461 <i>Laggera braunii</i>	1, 5, 16, 17
466 <i>Osteospermum vaillantii</i>	1, 2, 3, 4, 5, 6, 7, 8
468 <i>Phagnalon scalarum</i> ssp. <i>scalarum</i>	1, 4, 20
469 <i>Phagnalon scalarum</i> ssp. <i>meridionale</i>	1, 20
475 <i>Reichardia tingitana</i>	1, 2, 3, 4, 5, 6, 8, 22, 23, 24, 25, 26, 27, 28, 29, 30, 34
478 <i>Senecio hochstetteri</i>	1, 5, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18
492 <i>Vernonia richardiana</i>	1, 5, 7, 8, 9, 17, 18
498 <i>Asterolinon adoënsis</i>	1, 3, 5, 8
500 <i>Campanula edulis</i>	1, 4, 5, 8, 9

Table 7 *Continued*

Species	Primary Areas
509 <i>Myosotis abyssinica</i>	1, 5, 8, 9, 11, 16
539 <i>Alectra sessiliflora</i> v. <i>senegalensis</i>	1, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 31
540 <i>Bellardia trixago</i>	1, 5, 7, 8, 22, 23, 25, 26, 27, 28, 29, 30
542 <i>Celsia sudanica</i>	1, 5
550 <i>Misopates orontium</i>	1, 2, 3, 4, 5, 8, 9, 12, 15, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 37
551 <i>Parentucellia latifolia</i>	1, 22, 25, 26, 27, 28, 29, 30, 33
554 <i>Scrophularia arguta</i>	1, 3, 4, 5, 6, 21, 22, 26
560 <i>Verbascum sinaiticum</i>	1, 2, 3, 4, 5, 6, 8, 25
598 <i>Lavandula pubescens</i>	1, 2, 24, 25
602 <i>Nepeta ballotifolia</i>	1, 5
605 <i>Otostegia fruticosa</i>	1, 2, 3, 4, 5, 16
608 <i>Satureja punctata</i>	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 20, 21, 32, 34
624 <i>Cyanotis barbata</i>	1, 3, 5, 7, 8, 9, 11, 12, 13, 16, 17, 18, 32
630 <i>Aloë elegans</i>	1, 5
660 <i>Romulea camerooniana</i>	1, 5, 7, 8, 11, 12, 13, 16
679 <i>Holothrix tridentata</i>	1, 5, 16
681 <i>Satyrium coriophoroides</i>	1, 5, 7, 8, 16
683 <i>Juncus dregeanus</i> ssp. <i>bachitii</i>	1, 5, 7, 8, 9, 11, 12, 13
695 <i>Cyperus rigidifolius</i>	1, 5, 7, 8, 9, 11, 12, 13, 14
707 <i>Kyllinga chlorotropis</i>	1, 5
728 <i>Agrostis lachnantha</i>	1, 5, 8, 9, 11, 12, 13, 14
729 <i>Aira caryophyllea</i>	1, 3, 5, 8, 9, 10, 11, 16, 22, 26, 27, 28, 37
731 <i>Andropogon distachyos</i>	1, 2, 4, 5, 8, 9, 11, 13, 16, 20, 22, 25, 26, 27, 28
742 <i>Aristida caerulescens</i>	1, 2, 3, 4, 5, 6, 20, 21, 22, 23, 25, 26, 27, 28, 29
764 <i>Brachypodium sylvaticum</i>	1, 5, 22, 26, 27, 28, 29, 38
765 <i>Bromus leptoclados</i>	1, 2, 4, 5, 7, 8, 9, 11, 12, 13, 14, 16
766 <i>Bromus pectinatus</i>	1, 2, 3, 5, 8, 14
767 <i>Calamagrostis epigejos</i> v. <i>capensis</i>	1, 8, 9, 14
825 <i>Festuca abyssinica</i>	1, 5, 7, 8, 9, 11, 12, 13, 16
826 <i>Gastridium phleoides</i>	1, 3, 5, 8, 22, 25, 26, 27, 28, 29
829 <i>Helictotrichon elongatum</i>	1, 5, 7, 8, 9, 11, 13, 20, 31
844 <i>Hyparrhenia multiplex</i>	1, 5
856 <i>Lophochloa phleoides</i>	1, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30
861 <i>Melinis tenuinervis</i>	1, 7, 8, 10, 11, 12, 14
874 <i>Panicum pusillum</i>	1, 5, 7, 8, 9, 10, 11, 12, 16, 17
879 <i>Pennisetum glabrum</i>	1, 4, 5, 7, 8, 9, 11, 16
880 <i>Pennisetum gracilescens</i>	1, 5
886 <i>Pentaschistis pictigluma</i>	1, 5, 7, 8, 16
887 <i>Phaenanthoecium köstlinii</i>	1, 5
889 <i>Poa bulbosa</i> v. <i>vivipara</i>	1, 22, 23, 25, 26, 27, 28, 29, 30, 33, 34, 36
890 <i>Poa leptoclada</i>	1, 5, 7, 8, 9, 10, 11, 12, 13, 16
894 <i>Rhynchelytrum longisetum</i>	1, 4, 5
912 <i>Snowdenia polystachya</i>	1, 5
928 <i>Tripogon leptophyllus</i>	1, 5
930 <i>Tripogon montanus</i>	1, 5, 8
932 <i>Vulpia bromoides</i>	1, 2, 3, 5, 8, 14, 16, 26, 27, 28, 33

(1) Dr Grau's recent monograph was received too late for this species to be excluded on the grounds that only the endemic subsp. *nubica* Grau occurs on Jebel Marra; however its inclusion is unlikely to affect the calculation.

original distribution maps which had been specially prepared from records in the Kew and British Museum (Natural History) herbaria, supplemented by information in the Flora of West Tropical Africa, 2nd edition, and the available parts of the Flora of Tropical East Africa. The records for Tibesti were taken from Quézel (1958). It was not until after the data had been processed that it was possible to visit Marseille in order to examine Professor Quézel's Tibesti collection.

A number of additional records for Tibesti were then obtained but this new information does not, in my opinion, materially affect the overall analysis.

The data were then processed with the aid of the computer at the Department of Applied Statistics, University of Reading, to produce single linkage and unweighted pair-group average linkage analyses using the Jaccard similarity coefficient ($a/(a + b + c)$), for common presence and the simple matching coefficient

$((a + d)/(a + b + c + d))$ for common presence and common absence. Holloway & Jardine (1968) for their zoogeographical studies used Preston's coefficient of dissimilarity, which can be considered to produce a mirror image of similarity, and they used single link clustering only.

The single linkage method is a chain-like reaction. It first clusters together those units mutually related with the highest possible similarity coefficient; then it successively lowers the level of admission by steps of equal magnitude. The admission of a unit or cluster into another cluster is by what Sokal & Sneath (1963) term the criterion of single linkage. Thus, if a similarity level of 0.88 would admit a unit into a cluster, a single linkage at that level with any member of that cluster would suffice to warrant admission. Similarly, any pair of units (one in each of two clusters) related at the critical level will make their clusters join. Consequently, the linking of two clusters by this technique, on the basis of a single bond, may mean that many of the members of the two clusters are far removed from each other. The two authors suggest a method of overcoming this difficulty by re-calculating the mean similarity values both within and between the groups.

Boyce (1969) describes the pair-group method as an agglomerative process in which the new groups produced at any stage in the clustering process contain only two members. These groups are produced by pairing those individual forms, or groups of forms produced at an earlier stage in the clustering process, for which the relation 'is most similar to' is reflexive. The average pair-group method measures the similarity between two groups as the arithmetic mean of the similarities between the individuals which make up the two groups. The addition of new unit members must progressively lower the average similarity. In a weighted version of the method it is possible to compensate for this by giving greater weight to units that are late entrants into the clustering process. This, as Sokal & Sneath point out, can lead to some distortion of the results. The unweighted version has the advantage of having a true average similarity for which confidence limits can be estimated.

The dendrograms produced as a result of the four cluster analyses represent a hierarchical classification at numerically defined levels conveniently represented on the ordinate by a similarity coefficient scale multiplied by 100 to give percentage values. The linkages established by the completely impartial judgement of the computer, however, require critical examination and the judicious weighting of the human brain in order to establish a truly logical hierarchical classification of the flora; the more obvious difficulties arising will now be discussed.

Both the single and pair-group linkage methods using the common presence or absence similarity coefficients could be immediately faulted in that they linked together the Ethiopian and Saharo-montane elements at 95 and 92 percent similarity levels respectively. The two elements have no taxa in common;

they are in fact united because of their obvious dissimilarity. For this, plus other obvious false, although less startling linkages, the dendrograms were rejected.

The second single linkage method, using common presence only, presented a fairly reasonable hierarchy which separated into four recognizable floristic units, but with a number of rather untidy lines which were joining their clusters rather low down in the similarity scale. This dendrogram too was rejected.

The unweighted pair-group average linkage method for common presence only (Fig. 26) produced what appears to be an acceptable hierarchy. A few species could perhaps have been linked differently. In my opinion *Bromus pectinatus* Thunb. should be linked with the East African highlands rather than Ethiopia and *Lavandula pubescens* Decne. with the Boreal rather than with the Saharo-montane. These are faults arising from the weighting given to primary areas which are in fact extensions of other areas rather than self contained units.

A third species, *Lotononis platycarpus* (Viv.) Pichi-Serm. is a widespread member of a genus centred on southern Africa. It is weakly linked with the Boreal cluster at the 25 percent similarity level. For the purposes of this analysis it is being regarded as a member of the Boreal element although it would probably have been preferable to have omitted it from the analysis.

Similarly *Andrachne aspera* Sprengel, which is weakly linked at the 36 percent level with a miscellaneous montane group centred on Ethiopia, belongs to the Saharo-Sindian Region. For the purposes of this analysis the entire group is included with that of the Ethiopian montane proper.

Four centres of origin can be identified from the clustering; they are Ethiopian montane, East African highlands, Saharo-montane and Eurasia (Boreal). The Ethiopian centre is clearly distinguished, with 14 taxa restricted to the primary area as defined in Fig. 25. If the broad view is taken, so as to include the Red Sea Hills and the Al Range, the number of taxa is increased to 18. From this analysis there appears to be a strong case for recognizing an Ethiopian Subregion within the Afro-montane Region, formal recognition, however, must depend on a future analysis of the Ethiopian flora.

In recognizing Ethiopia as a subregion, reference must be made to an important paper by Gillett (1955) who found an unexpectedly high number of taxa in common with East Africa and southern Ethiopia, thereby demonstrating the ineffectiveness of the low-land gap between the two areas. Gillett's paper, however, must not be used outside its original context in order to subdivide Ethiopia phytogeographically. It is perhaps of interest to note that of the 14 taxa already mentioned as being restricted to Ethiopia, no less than 10 are concentrated to the north of the Gillett Line (latitude 10°N); this sample of course is too small to be of statistical significance.

The East African Highlands element is less clearly defined since its component taxa are generally widely distributed throughout the African continent. It is

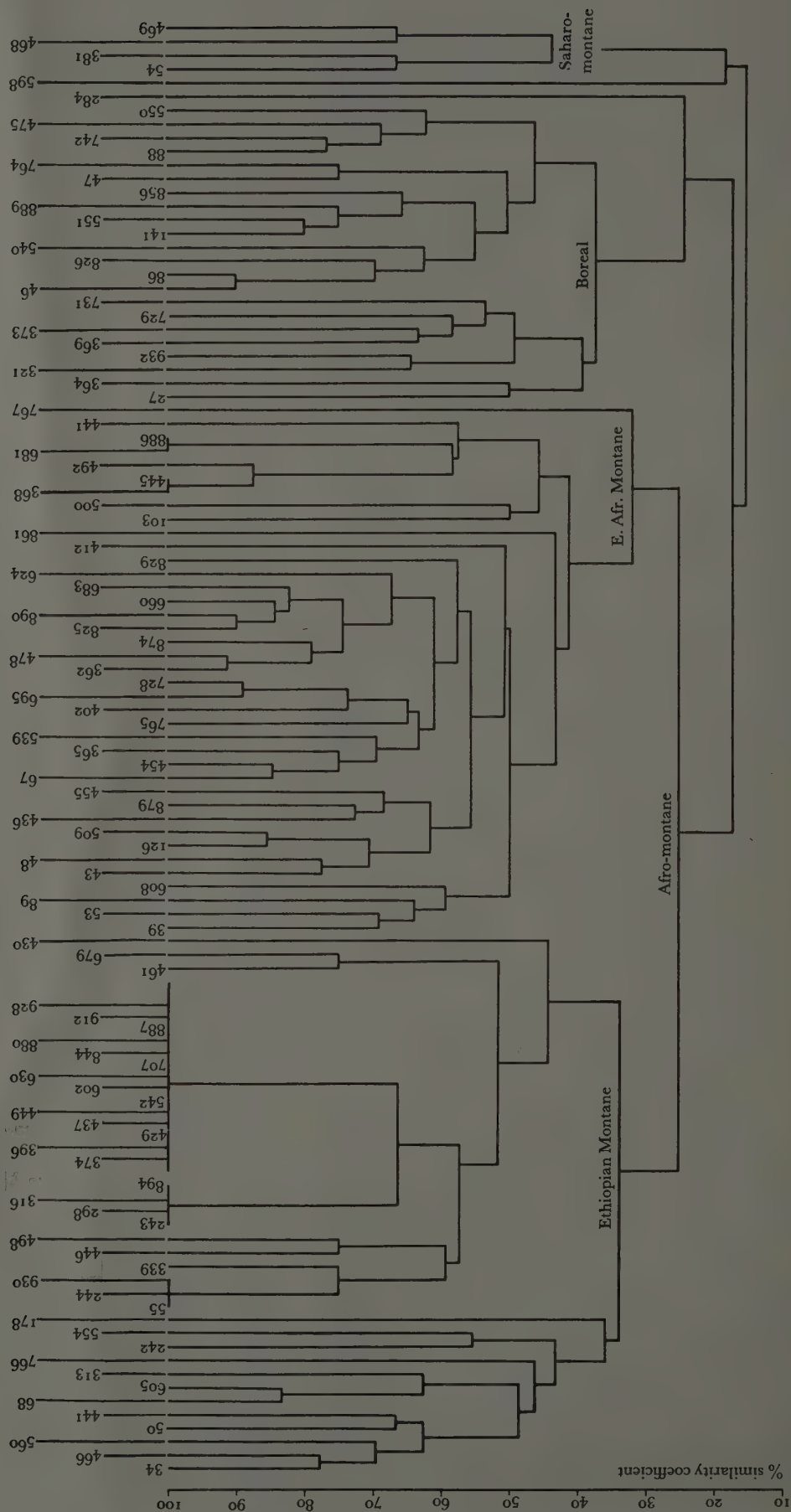


Fig. 26 Cluster analysis of the montane and temperate elements.

perhaps significant that unlike the Ethiopian element, there are no taxa otherwise restricted to the East African Highlands (primary area 8) occurring on Jebel Marra.

The Boreal element presents a confused clustering since the dendrogram represents a combination of the normal distribution and the extent of penetration into Africa, consequently it does not reflect the derivation of the Boreal element within the African flora. The data requires a different form of presentation.

The Saharo-montane element is clearly defined, in any case, the sample is too small to be ambiguous.

A visually meaningful presentation of the distribution of a floristic element can be obtained by means of isochores. The term is redefined from Good (1964, p. 179) as 'A line joining equal number of taxa belonging to the same chorological unit'. The isochore is intended to be used for phytogeography in a similar way that the isoflor, as defined by Davis & Heywood (1963), is used for taxonomic groups.

The four floristic groupings obtained from the dendrogram are accepted as such, with the exception of *Lavandula pubescens* Decne. which is transferred from the Saharo-montane to the Boreal element. The isochores are plotted as percentages of the density, that for Jebel Marra will naturally be at the 100 percent level for the four maps. The isochores, when used in conjunction with the data matrix (Table 7), suggest probable migration paths for each of the four elements. These migration paths are relative to Jebel Marra and will not necessarily indicate the major paths for a particular element, nor are these paths necessarily contemporaneous.

The following extensions, in addition to that for Jebel Marra, of the Ethiopian element can be identified (Fig. 27).

- 1 A northerly extension along the Red Sea Hills and the Yemen into the eastern Mediterranean, with one species, *Polygala abyssinica* R.Br. ex Fresen. extending to the Himalayas.
- 2 A southerly extension into the East African Highlands, with *Bromus pectinatus* Thunb. having an outlier as far south as the Basuto Highlands.
- 3 A Cameroon outlier consisting of *Laggera braunii* Vatke, *Otostegia fruticosa* (Forsk.) Briq. and *Holothrix tridentata* (Hook.f.) Reichenb.f.
- 4 A western Mediterranean extension consisting of *Andrachne aspera* Sprengel, *Argyrobium arabicum* (Decne.) Jaub. & Spach, *Scrophularia arguta* Solander and *Bromus pectinatus* Thunb.

The probable migration paths that can be deduced from the above are shown in Fig. 28. The Jebel Marra massif is from a relatively recent volcanic upheaval, hence taxa can be considered as migrating to and not from the massif. The source of the Ethiopian element for Jebel Marra is therefore indicated as the Ethiopian Highlands. The map, however, is schematic and is not meant to imply that the taxa are of autochthonous origin in Ethiopia (see Chapter 8). Thus, for example,

the arrow pointing into the Himalayas almost certainly represents a Himalayan extension into Ethiopia! Such finer distinctions, however, do not affect the main issue, which is how the plants reached Jebel Marra from Ethiopia. The Nuba Mountains are suggested as a possible staging post between Ethiopia and Jebel Marra (see Chapter 11), although there is no evidence yet available to support such a hypothesis. It should be pointed out that the seeds of all 39 taxa are relatively small and capable of wind dispersal and that the prevailing winds just after the rainy season (when seeds can be expected to be ripe) are from the east. Nevertheless, external transport by birds is favoured in preference to wind transport (see Wickens 1976a for further discussion).

Of the 39 East African Highland taxa, 36 occur in Ethiopia (Fig. 29); 30 are widely distributed within Ethiopia, 5 are found to the south of the Gillett Line and only 1, *Galium thunbergianum* Ecklon & Zeyher occurs to the north of the Gillett Line and is absent from southern Ethiopia. On the basis of such statistics it could be argued that the East African element could have reached Jebel Marra by the same route as that followed by the Ethiopian element. Moreover there is a strong Cameroon extension of 28 species; 27 of these occur in Ethiopia and all occur in the highlands of southern Tanzania. It is obvious, therefore, that these are widespread taxa and it may perhaps be assumed that the Cameroon extension followed the Nile-Congo and Chad-Congo divides, with a branch off to the Jebel Marra massif (Fig. 30), the route postulated by Coetzee & Zinderen Bakker (1970). However, there is very little high ground along this route above 1000 m. This may have been sufficient for the forest species to have used as a migration route in the past when climatic conditions were favourable, but would have been too low for the obligate high altitude flora (Wickens, 1976a). Long-distance dispersal from Ethiopia and East Africa is, therefore, regarded as the means by which such plants would have reached Jebel Marra.

The 24-taxa-strong Boreal element also includes 7 taxa with a more widespread distribution. The 7 would have been segregated out separately had not their distribution around the Mediterranean been unduly weighted in relation to the rest of their range. The species are: *Capsella bursa-pastoris* (L.) Medic., *Cerastium fontanum* Baumg., *Berula erecta* (Hudson) Coville, *Misopates orontium* (L.) Raf., *Aira caryophylla* L., *Brachypodium sylvaticum* (Hudson) P.Beauv. and *Poa bulbosa* L. var. *vivipara* Koeler. Nevertheless, it is convenient to include them here since it is reasonable to imagine that they would have followed the same migration paths into Africa.

The isochore map (Fig. 31) shows the greatest concentration of taxa to be in southern Europe, i.e., suggesting that they are widespread species. In North Africa and the Orient, the concentrations in the eastern and western ends of the Mediterranean appear to be more-or-less equally balanced and with an extension along the Red Sea into Ethiopia and southern Africa.

Fig. 27 Isochores for the Ethiopian element (39 species).

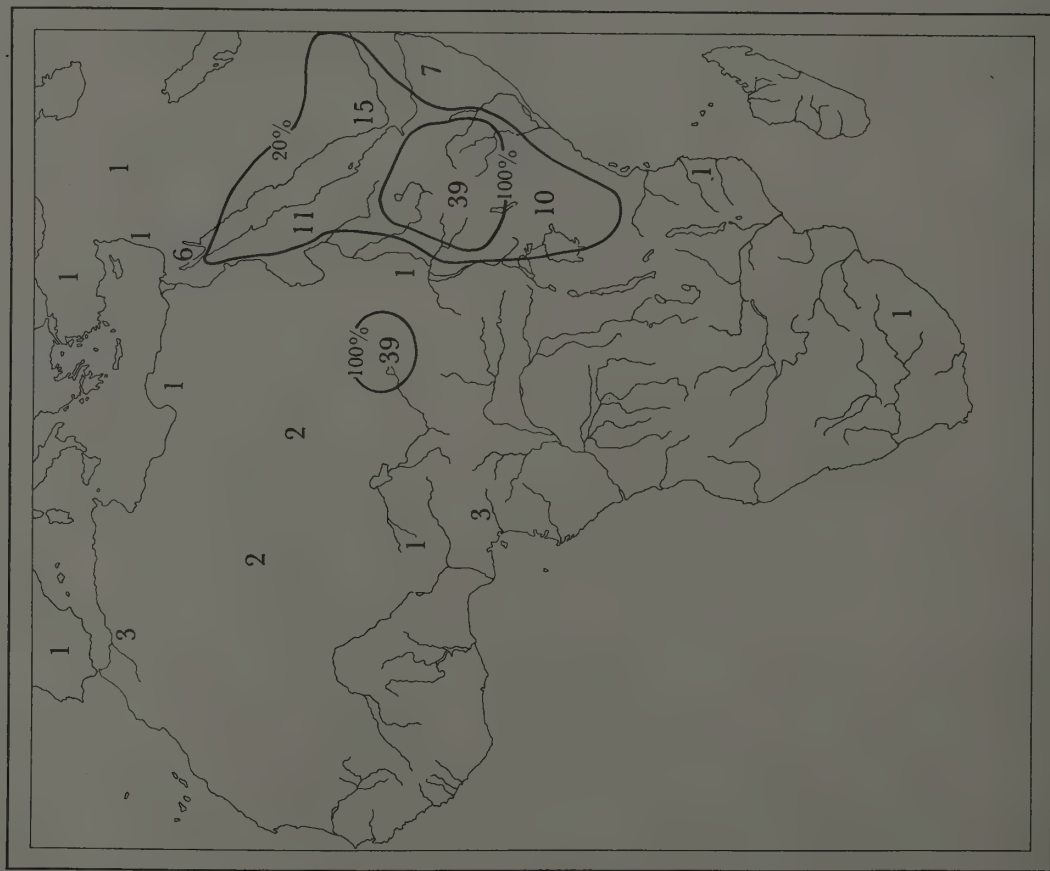


Fig. 28 Ethiopian element migration route.

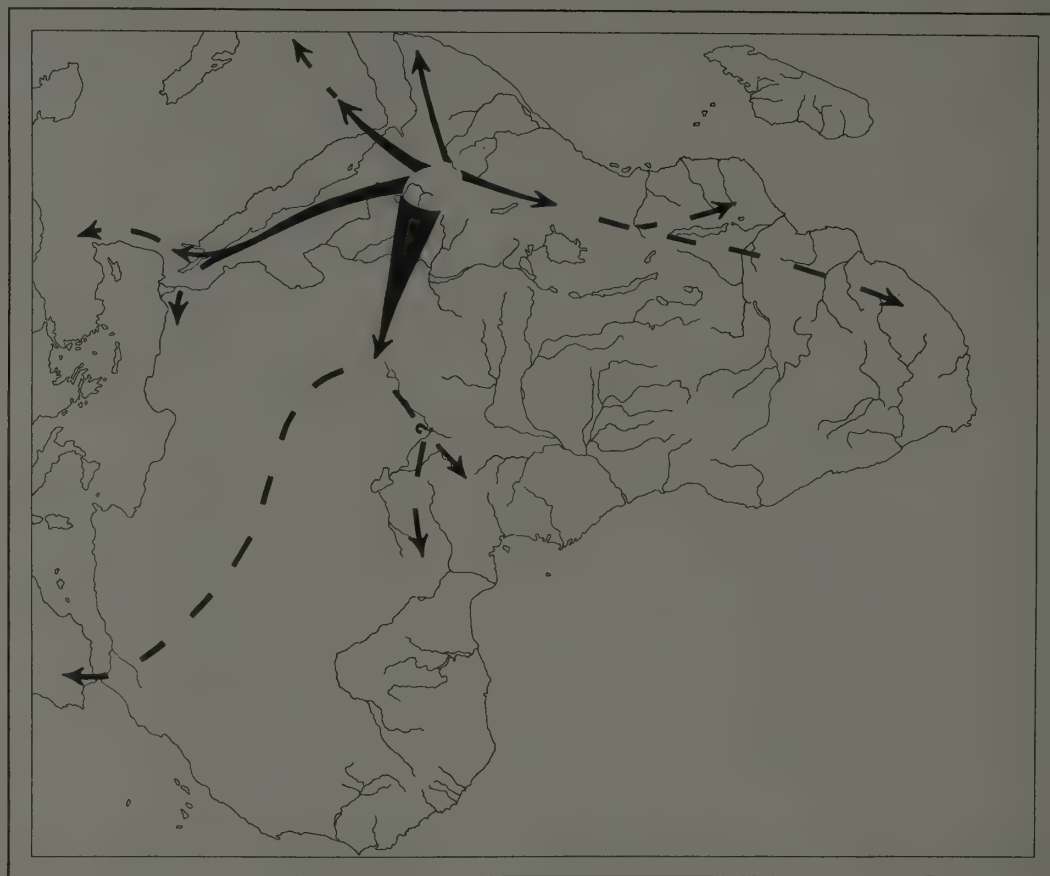


Fig. 30 East African element migration route.



Fig. 29 Isochores for the East African element (39 species).



Such statistics would suggest a direct north to south migration invoking long distance dispersal by birds. Lynes (1921), an ornithologist who made a special study of the avifauna of Darfur, makes the following observation, '... there is markedly no migration passage (of birds) through Jebel Marra or Central Darfur. There are quite a number of *wintering* European birds there, ... but their route hither and hence is unknown. The new study of geographical races tells us that many of these birds must come from Eastern or SE. Europe and SW. Asia—very likely none from Western Europe; if the latter be the case a reasonable suggestion is that these individuals are deployments from the autumn contingent that follows the Eastern route ... (via Palestine, the Nile valley and the Red Sea to the south) ...'.

The Red Sea route appears to be a logical alternative. There are 5 taxa, *Hypericum perforatum* L., *Parentucellia latifolia* (L.) Caruel, *Poa bulbosa* L. var. *vivipara* Koeler, *Lophochloa phleoides* (Vill.) Reichenb. and *Cerastium fontanum* Baumg. subsp. *triviale* (Link) Jals which are not recorded in primary areas 2–5, but with the exception of *Cerastium fontanum*, do occur in North Africa. These 5 are weedy herbs and could have been introduced with agricultural crops. *Hypericum perforatum* L. and *Cerastium fontanum* Baumg. are evidently introductions from before there was any European influence in the area, for they were first recorded by Lynes in 1920–21. The same probably applies to *Lophochloa phleoides* (Vill.) Reichenb. and *Parentucellia latifolia* (L.) Caruel collected by Miss Steele and Mr Dandy in 1932 & 1934 respectively.

There is also the possibility of the trans-Sahara route via the Ahaggar and Tibesti. The 7 taxa from those two mountains are *Erodium malacoides* (L.) L'Hérit., *Misopates orontium* (L.) Raf., *Lotononis platycarpus* (Viv.) Pichi-Serm., *Parietaria debilis* Forster f., *Andropogon distachyos* L., *Aristida caerulea* Desf. and *Lophochloa phleoides* (Vill.) Reichenb. All, apart from the last one, also occur along the Red Sea migration route. As has already been pointed out, *Lotononis platycarpus* (Viv.) Pichi-Serm. belongs to a genus with southern African affinities, and is the only species of it to have penetrated into the Mediterranean area.

Quézel & Martinez (1958–59) have satisfactorily demonstrated the extension of the Mediterranean flora into the Sahara during the Pleistocene (Fig. 23).

According to Quézel (1958) this Mediterranean intrusion was primarily western Mediterranean in origin. Gillet (1968) states that there are no Mediterranean representatives on Ennedi today. Yet there must have been some contact between Jebel Marra and the Saharan mountains since there are no less than 13 Afro-montane species in common, plus 4 Saharo-montane. There would, therefore, appear to be two alternatives, a strong migration route during the Pleistocene, the evidence for which has now almost totally disappeared, or, a very weak link that still survives. Further palaeoecological research in the Jebel Marra area might throw a little more light on the matter.

Moreau (1952), from his studies of bird distribution concluded that there can only have been an intermittent exchange across the Sahara, and much of that has been in recent times. Bruneau de Miré (1960) has also noticed that insects with Mediterranean affinities which occur in Tibesti are not represented on Jebel Marra; the Jebel Marra insects instead have affinities with north-eastern Africa. This additional evidence regarding the avifauna and insect population would support the second hypothesis of there being only a weak trans-Saharan link via Tibesti. The tentative migration routes for the Mediterranean element on Jebel Marra are shown in Fig. 32.

There are only 4 taxa belonging to the Saharo-montane element; they are *Silene lynesii* Norman, *Olea laperrinei* Batt. & Trab., *Phagnalon scalarum* Schweinf. ex Swartz subsp. *scalarum* and *meridionale* (Quézel) Wickens. These are of interest because of their disjunct distributions (Fig. 33). They do not occur on Ennedi although they might reasonably be expected to do so. *Olea laperrinei* does occur in the Ahaggar but not in Tibesti where it would be expected. *Phagnalon scalarum* subsp. *scalarum* has the unusual distribution of Tibesti, Jebel Marra and the Yemen! Such a distribution could be due to long distance dispersal, or poor collection or even to extinction of the intervening locations. The migration routes are shown in Fig. 34.

Summing up, analyzing distributional data using the computer seems to be a satisfactory means of handling such complex data. As can be seen from the discussion, the meaningfulness of the results is very much governed by the selection and presentation of the data, and a certain amount of discretion must be exercised in the interpretation of the results. It is true that a somewhat similar result was laboriously obtained by visual inspection; this verification is gratifying and vindicates the method used.

The conclusions obtained regarding the migration routes now need to be examined in relation to the geological history of Africa and its neighbours in order to determine when the routes were likely to have been in operation.

The floras of the Afro-alpine and Afro-montane regions generally appear to have been derived almost entirely from outside sources, with very little evidence of speciation by indigenous lowland taxa (Moreau, 1952; Hedberg, 1961, 1964, 1965, 1970). The more temperate climatic conditions of the montane uplands would seem to have imposed a physiological barrier against which the lowland species have been unable to acclimatize themselves. This is to be expected for it is in keeping with the concept of floristic kingdoms and their endemic families in relation to the climatic zones of the world.

As a hypothesis, it is suggested that the upper parts of the mountains of Africa must have remained virtually unpopulated until conditions were suitable for an influx of temperate taxa, especially Mediterranean plants which are already adapted for a short day length and low temperature survival. In the absence of any

Fig. 32 Boreal element migration route.

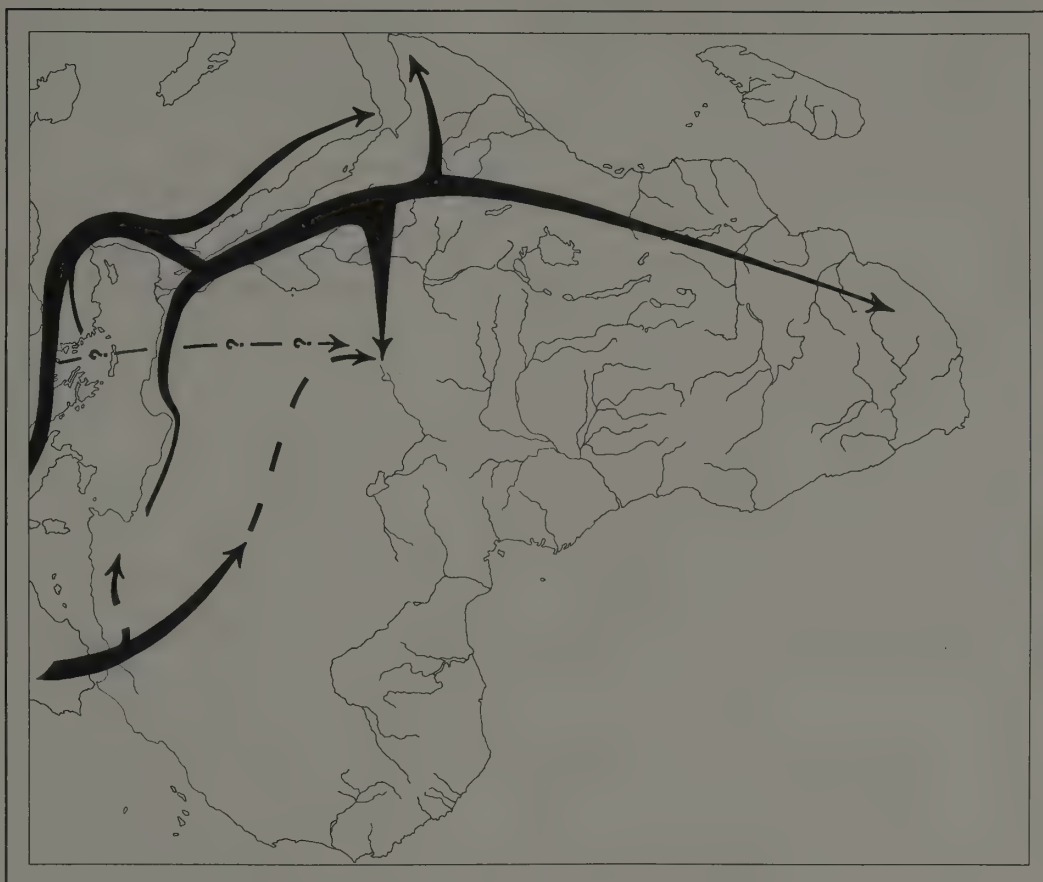


Fig. 31 Isochores for the Boreal element (24 species).



competition by other plants, speciation could proceed virtually unhindered. The conditions would appear to be suitable for rather wild speciation, known as the Sewell Wright effect, a phenomenon which Cain (1944) describes as the relatively rapid evolution of taxa under conditions of complete or partial isolation, especially of small populations, which are often of a non-adaptive type.

Hedberg (1965) lists 87 taxa as being endemic Afro-alpine or Afro-montane. The subgenus *Dendrosenecio* is a typical representative, with 15 taxa which occur individually on 6 of the East African mountains and 2 taxa which are individually represented on 2 mountains (Hedberg, 1957; see also Mabberley, 1973, for taxonomic revision and discussion). This is certainly not suggestive of rapid evolution. The advantage gained from freedom of competition by other plants appears to be more than cancelled out by the extreme climatic conditions within the Afro-alpine zone and the necessity for plants to adapt themselves accordingly, non-adaptive forms would not survive. The adaptation of such plants to such conditions is discussed by Hedberg (1964) and for *Dendrosenecio* by Mabberley (1973).

Hedberg (1970) suggests that the high degree of endemism, 81 percent of the Afro-alpine flora, is indicative of its enclaves having been long isolated from each other and from other temperate areas. Although species may not evolve at the same rate, the assumption is generally made that a long time is required for speciation. The high degree of endemism noted certainly supports such an assumption here.

The degree of endemism for the Jebel Marra area is low, 1.2 percent. The montane endemic taxa are: *Gnaphalium marranum* Philipson, *Celsia sudanica* (Murbeck) Wickens, *Kickxia aegyptiaca* (L.) Náblek subsp. *virgata* Wickens, *K. dibolophylla* Wickens, *Plectranthus jebel-marrae* Wickens & Mathew, *Felicia dentata* (A. Rich.) Dandy ex F.W. Andr. subsp. *nubica* Grau, *Senecio* sp. nov., *Habenaria* sp. nov., *Cyperus* sp. nov. and *Pycneus* sp. nov. There is also a *Vernonia* sp. nov. representing the sole lowland endemic.

The undescribed species are only known from either single or very few gatherings. More material is required before they are described. The taxonomic and phyto-geographical affinities of those endemics that have been described are not yet fully understood. *Felicia dentata* subsp. *nubica* is closely allied to subsp. *dentata* from Ethiopia. *Celsia sudanica* (Murbeck) Wickens is close to *C. pedunculosa* Steud. & Hochst. ex DC. of the Afro-oriental Domain. *Kickxia aegyptiaca* subsp. *virgata* belongs to a taxon whose subspecies are widely distributed through the Western and Middle Saharo-Sindian Sub-regions, with an extension into the eastern Mediterranean. The relationships of *Plectranthus jebel-marrae* is believed to be with *P. parvus* Oliver from the uplands of Tanzania and *P. candelabrisformis* Launert from Tanzania, Zambia and South West Africa, the genus, however, is in need of revision. The affinities of the remaining two species are not known; again the genera are in

need of revisions.

From a study of the distribution maps for the montane species found on Jebel Marra it is obvious that the flora is of a mixed derivation which must presumably post-date the first eruption during the Miocene. Its constituent taxa could possibly have arrived more or less contemporaneously with those of East Africa and Ethiopia.

East Africa during the Lower Tertiary is believed to have been a gently undulating plain (Hamilton, 1974). Downfaulting of the rift valleys initiated during the Upper Miocene was succeeded by an upwarping of the shoulders of the rift valleys during the Upper Miocene, a process that continued into the Middle Pleistocene (Chapter 10). Most of the East African mountains are a result of the volcanic activity that accompanied these movements, with the exception of Ruwenzori, which is an upthrust block massif. These mountains are of unequal ages, from Miocene to Upper Pleistocene, and have remained isolated from each other since their origin (Hedberg, 1970). It is therefore highly probable that both the Afro-alpine and Afro-montane floras post-date the beginning of the Miocene.

At least part of the Ethiopian plateau has been in existence since the Cretaceous (Moreau, 1952), with later rifting and upthrust as for East Africa. Its flora could therefore be much older than that of East Africa.

It is perhaps pertinent to examine the historical events at some key point along a postulated migration route in order to see how it is operating. Zohary (1962) has prepared a well documented account of the phyto-geographical history of Israel, an important staging post for the Mediterranean element. The Tethys Sea covered much of northern Israel and Syria during the Cretaceous and did not completely disappear until the Pliocene. During the Miocene a tropical climate prevailed, permitting a northward migration of savanna species from Africa into Israel, to the almost total exclusion of more temperate species. With the establishment of a land connection between Israel and north-eastern Mediterranean countries following the disappearance of the Tethys Sea, together with a change of climate from tropical to Mediterranean, an influx of Mediterranean species entered Israel. The over-land connection with tropical Africa was broken by the severe desert conditions of Sinai and Egypt.

Zohary points out that this Mediterranean element was unable to enter Israel from North Africa during pre-Pliocene times since many of its constituent species are from the north-eastern Mediterranean and do not occur in North Africa. The Irano-Turanian element also arrived in Israel during the Pliocene, while Euro-Siberian and western Mediterranean plants are regarded as entering Israel during one of the humid periods of the Pleistocene.

From the brief résumé given above it is evident that the eastern Mediterranean element could not have entered Africa before the Pliocene, with the Euro-Siberian and western Mediterranean elements following during the Pleistocene. The route would follow the

Fig. 34 Saharo-montane element migration route.

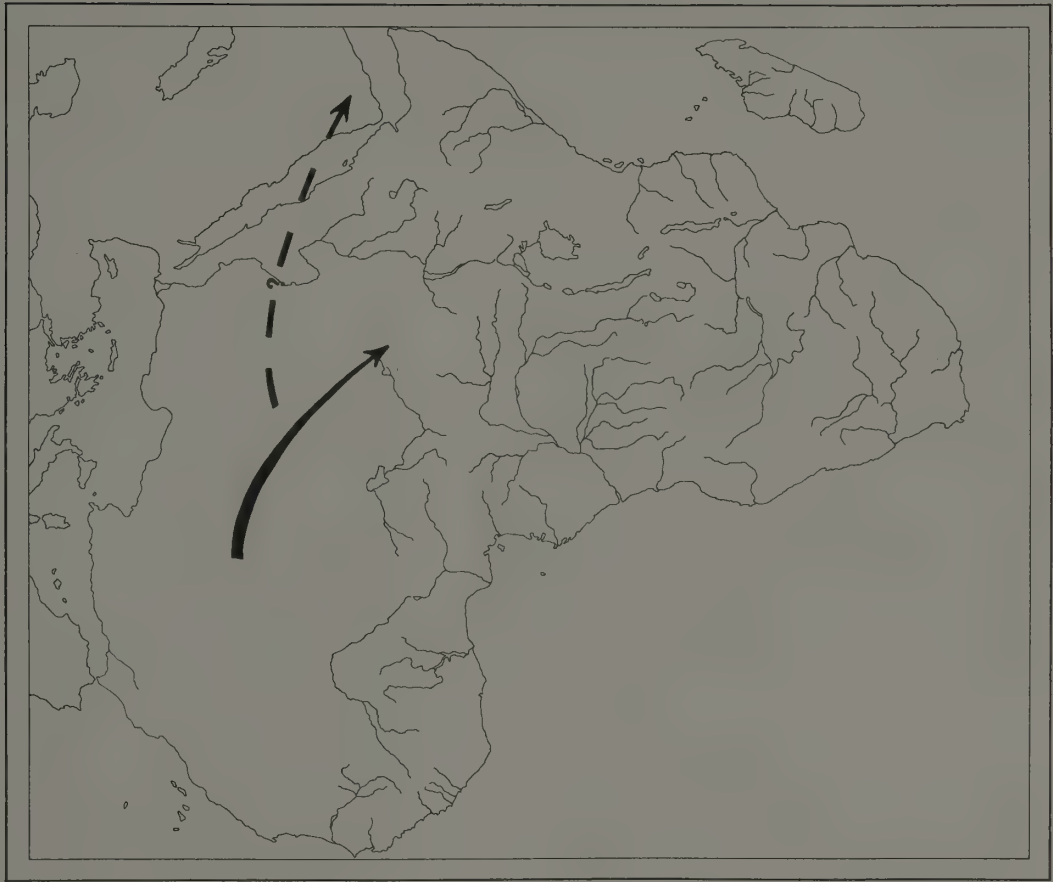


Fig. 33 Isochores for the Saharo-montane element (4 species).



low line of hills bordering the Red Sea and so into Ethiopia. The climate in the Red Sea Hills would have been, as it is today, slightly cooler and more humid than the surrounding lowland plain.

The ombrothermic diagram for Suakin (Fig. 19) shows the bulk of the rainfall to be concentrated in the months of September to January. The diagram approaches the configuration of a Mediterranean type climate. It would require very little increase in rainfall during the winter months to facilitate the unimpeded migration of Mediterranean species along the Red Sea Hills in as far as favourable climatic conditions are concerned.

It is my impression, obtained while working in the herbarium at Kew, that the Mediterranean element is much better represented in Ethiopia than in East Africa. Mr I. Friis, who is preparing a check list of the Ethiopian flora, supports this view (verbal information, 1971). This is, of course, consistent with expectations that the greater the distance from the source, the fewer the species that are likely to be present.

The Himalayan genetic element recognized by Hedberg (1965) and represented on Jebel Marra by *Polygala abyssinica* R.Br. ex Fresen., *Polygonum nepalense* Meisn., *Otostegia fruticosa* (Forsk.) Briq. and *Satureja punctata* (Benth.) Briq. could date from the Miocene, when the southern Arabian pathway was open for tropical species, although a Pliocene dating might perhaps fit better with the movement of the Irano-Turanian element; there is no evidence for a recent migration, as is evident by the disjunct distribution.

Wild (1968) suggests that the relatively uniform climatic conditions that must have prevailed over much of the old peneplain landsurface prior to the mountain building episodes of the Miocene, would have encouraged a widespread distribution of the Cape flora. There are palaeomagnetic indications that the African continent had drifted northwards by 15° during the Cretaceous (Veevers *et al.*, 1971). Such a movement would be associated with a parallel shift in the climatic belts, which would be sufficient to cause the more widespread proto-Cape flora to become concentrated in the southern extremity of the continent.

The montane species of what Hedberg (1965) regards as South African, Cape and South-hemispheric temperate elements are relic representatives of this formerly much more widespread flora. On Jebel Marra the Cape and South African elements are represented by *Pentaschistis pictigluma* (Steud.) Pilger, *Blaeria spicata* Hochst. ex A.Rich. and *Lotononis platycarpus* (Viv.) Pichi-Serm.

The chronology suggested is intended to refer to what is believed to be the earliest possible date during which a floristic element as a group might have been expected to arrive; some members might still be in the process of migrating. Much is purely speculative and is unlikely to be substantiated by factual evidence, neither can it be disproved. Very little is really known about conditions in Africa during the Pleistocene, $2\frac{1}{2}$ million years ago. Even less is known about the Miocene, 7–26 million years ago!

Chapter 14

Discussion and conclusions

There have been very few phytogeographical studies of the flora of the Sudan Republic. The pteridophyte flora has been surveyed by MacLeay (1953, 1955a), but the angiosperm flora has escaped the attention of phytogeographers, apart from the pioneer work of Schweinfurth (1868) for the Red Sea Hills, and Good (1924) for Jebel Marra.

The 145 species collected by Admiral Lynes from Jebel Marra were analyzed by Good, who recognized the following four elements.

- 1 Cosmopolitan or widely distributed species.
- 2 A Sudano-Zambezian (tropical African) element.
- 3 A Saharo-Sindian (Afro-Indian) element.
- 4 A Boreal (Mediterranean-West Asian) element.

Good also comments on the strong affinity of the Jebel Marra flora with north-eastern Africa and the almost as strong affinity with East Africa. He also considers it noteworthy that the ratio of species to genera is low and that there are few endemics. This he interprets as indicating the Jebel Marra flora to be derived and not developed *in situ*.

It is perhaps interesting to discover that the conclusions obtained from Good's rather crude analysis of a limited sample of the total flora are very similar to those arrived at in this present analysis. However, I am unable to agree with his hypothesis that the present-day savanna flora is spreading northwards, still following the retreat of the Pleistocene Ice Age. If anything, the savanna belt is retreating southwards, being forced back by the activities of man and his grazing animals. Neither do I accept his corollary that the northern temperate plants must have been the first to arrive, followed by the Saharo-Sindian and finally by the Sudano-Zambezian elements. These ideas just do not fit the facts discussed in Chapters 12 and 13.

Indeed there is evidence that some of the northern temperate species are only very recent arrivals in Africa. For example, the familiar Palaeo-Boreal herb, *Epilobium hirsutum* L., is very variable with regard to leaf size and shape, degree of hairiness and size of flowers, yet is remarkable in its uniformity throughout its African distribution. Brenan (1953) suggests that such uniformity indicates a relatively recent and rapid migration southwards of a single race capable of tolerating African conditions.

The meaningfulness of the phytogeographical data from a given area only becomes apparent when compared with data from other neighbouring areas. Of the African montane vegetation the phytogeography of the Afro-alpine flora for East Africa (but not yet for

Ethiopia) is now well known, due to the researches of Hedberg (1957, 1959, 1965, 1970). The montane forests of Malawi have been ably surveyed by Chapman & White (1970). Unfortunately neither of these two elements are particularly well represented on Jebel Marra. The important Afro-montane and temperate elements have not yet been regionally surveyed.

There are surprisingly few recent surveys of individual mountains. In West Africa the Nimba Mountains have been well documented by Schnell (1952), but are of little interest to this present study. A check list of the flora of Cameroon Mountain, however, would be of immense interest since there are a number of interesting species in common with Jebel Marra.

In the Sahara there is an excellent account of the flora of Tibesti by Quézel (1958), and of Ennedi by Gillet (1968). Regrettably there are no comparable works available for Ethiopia and East Africa. In the absence of check lists for Ethiopia and East Africa it is only practicable to compare the affinities between Jebel Marra, Ennedi and Tibesti.

The affinities between Tibesti and Jebel Marra have been briefly surveyed by Bruneau de Miré (1960), Bruneau de Miré & Quézel (1961) and Quézel (1965); and between Ennedi and Jebel Marra by Gillet (1957).

I have been fortunate enough to be able to visit Marseille and examine the Tibesti specimens collected by Professor Quézel. As a result of this study, the endemic species from Tibesti have been reduced from 56 (10.7) to 38 (7.2 percent); further study might reduce these figures even further. This lower figure is more in keeping with the noticeable absence of the Sewell Wright effect observed amongst the Afro-alpine and Afro-montane flora of tropical Africa, and discussed in the previous chapter.

Of the 527 species listed by Quézel (1958), 140, or 26.6 percent also occur in the Jebel Marra survey area, but only 12 species or 2.3 percent are represented in the montane zone. These 12 taxa consist of 3 Saharo-montane taxa, *Silene lynesii* Norman, *Phagnalon scalarum* Schweinf. ex Swartz subsp. *scalarum* and *meridionale* (Quézel) Wickens; 3 Afro-montane species, *Argyrolobium arabicum* (Decne.) Jaub. & Spach, *Satureja punctata* (Benth.) Briq. and *Helictotrichon elongatum* (Hochst. ex A.Rich.) C.E. Hubbard; 1 Karoo-Namib species, *Lotononis platycarpus* (Viv.) Pichi-Serm.; 1 temperate and tropical montane species *Parietaria debilis* Forster f.; and 4 Mediterranean-linkage species, *Erodium malacoïdes* (L.) L'Hérit., *Misopates orontium* (L.) Raf., *Andropogon distachyos* L. and *Aristida caerulea* Desf.

By contrast, the Saharo-montane element is not represented on Ennedi; the Boreal element is represented by *Phragmites australis* (Cav.) Steud. subsp. *altissimus* (Benth.) W.D. Clayton, a species that does not occur on Jebel Marra although found on Jebel 'Uweinat (Shaw, 1934). The Afro-montane element on Ennedi is represented by only one species, *Tripogon multiflorus* de Miré & Gillet, whose distribution range includes Aïr, Tibesti, Ennedi, Ethiopia and Kenya, but apparently not Jebel Marra, although it should be sought for there. Out of the 526 species listed by Gillet (1968) for Ennedi, 201, or 38.2 percent are also found within the Jebel Marra area. These figures for Tibesti and Ennedi show the expected decline of species in common associated with increasing distance and increasing latitude.

Sometimes the absentees are of as much interest as the species in common. The disjunct distribution of *Phagnalon scalarum* Schweinf. ex Swartz subsp. *scalarum* has already been mentioned in Chapter 13. Its presence in the Yemen but not in Ethiopia could perhaps suggest a more direct route between the Yemen and Tibesti than the one shown for the Ethiopian-montane element in Fig. 28, p. 72. The distribution of *Tripogon multiflorus* gives a little more support to such a route, which is shown in Fig. 30, p. 73.

The disjunct distribution of *Erica arborea* L. is perhaps even more significant. It has recently been recorded from Tibesti by Bruneau de Miré & Quézel (1959), who also mention that its presence in both Tibesti and the Ahaggar during the Pleistocene was previously known from the fossil pollen record. It does not occur on Jebel Marra, although it is known in the Sudan from the Imatongs; its African distribution stretches southwards through Ethiopia and East Africa to the Cape. Its absence from Jebel Marra can be regarded as being further confirmatory evidence of a two-pronged penetration of the Mediterranean flora into Africa during the Pleistocene, one route being southwards across the Sahara to the Sahara mountains; the second route following the Red Sea Hills into Ethiopia, etc. Nevertheless it must be borne in mind that Jebel Marra is a relatively small mountain whose flora has been drastically effected by man. *Erica arborea* L. could have been present in the past and then destroyed due to man's activities. It is unwise therefore to presume too much from absentees.

The conclusions arrived at as a result of this phytogeographical analysis are as follows:

- 1 As a consequence of the Pleistocene sand invasions, the original savanna flora was either partially destroyed or compressed against the forests of the Guineo-Congo Region.

- 2 As climatic conditions improved the sands were colonized by plants capable of withstanding the drier conditions imposed by the sandy soils. The southern limits of this new Sahelian Domain flora now correspond to the southern limits of the Pleistocene sands, its northern limit is that of the southern limit of the Sahara and its Saharo-Sindian flora.
- 3 At the same time there was also an influx into the Sudan of species from the east, whose westward movement was impeded by the barrier imposed by Mega Chad. This is reflected today by there being only 58.2 percent similarity between the floras of the Sudan and Nigeria plus Niger.
- 4 The Mediterranean and other temperate elements reached Jebel Marra mainly by way of the Red Sea Hills and Ethiopia.
- 5 There has been surprisingly little evidence of contact between Tibesti and Jebel Marra, and the Mediterranean element that reached Tibesti during the Pleistocene did not penetrate further southwards.
- 6 The history of the Afro-montane flora from Jebel Marra is probably contemporaneous with that of East Africa.
- 7 There must have been a direct, though perhaps tenuous, connection with the rainforests of the Congo via the Wadi Azum, and perhaps with the southern Sudan via the Bahr el Arab and the Wadi Bulbul.
- 8 Man has played an important part in modifying the vegetation and flora of the Jebel Marra massif during the last 2000 years, although Europeans had scarcely any impact until 50 years ago. Jebel Marra, by virtue of its geographical position, is the hub of a number of important trans-African trade routes, consequently man has had ample opportunity not only to destroy but also to introduce.
- 9 Apart from the activities of man and his grazing animals, the main source of plant introductions must have been by long distance dispersal. There is no direct evidence that birds could be an important agent for dispersal, but external transport by birds is regarded as a possibility (Wickens, 1976a).
- 10 Finally, but not least, an understanding of the phytogeographical affinities of the Jebel Marra flora is of considerable importance. Because of its geographical position it is ideally suited for a study of the interplay of tropical and temperate floras within the African continent.

Chapter 15

Check list – Introduction

The preparation of this check list was begun several years after the writer had carried out an ecological survey in the Jebel Marra area for FAO; further research work on the flora was not then contemplated. The bulk of the collection had already been determined and incorporated into the herbarium at Kew before this present study was commenced. All the material collected, together with specimens of earlier collectors found in the herbaria at Kew and the British Museum (Natural History) have since been re-examined during the preparation of this check list of the Jebel Marra flora. Unless otherwise stated, all specimens cited are to be found in the Herbarium at Kew.

In the course of this re-examination it was found that a number of specimens had been misidentified. Many of these misidentifications had been recorded in the writer's original report to FAO (Hunting Technical Services, 1968) and also in a list of corrections to Andrews, *Flowering Plants of the Sudan* (Wickens, 1969b). The former publication is now out of print and also unavailable to the public and consequently will not be referred to in the check list; where necessary, reference will be made to the second publication.

The preparation of a check list is a time consuming operation; whenever possible use has been made of specialists in such families as the *Compositae*, *Leguminosae*, *Orchidaceae*, *Cyperaceae*, *Gramineae*, etc, in order to hasten the work. The preparation of the list has been greatly assisted by Mr J. E. Dandy providing a list of both his own collection for Jebel Marra and that of Admiral Lynes in the British Museum (Natural History). Mr J. K. Jackson has kindly provided a similar list for his collections at Kew.

Professor Täckholm has also given lists of collections by Professor Kassas and Dr Drar from Jebel Marra, for which I am most grateful. The Kassas collection is now in the herbaria of the Universities of Khartoum (KHU) and Cairo (CAI). Those specimens that are already known to occur on Jebel Marra have been included in the check list without inspection or acknowledged as *non vidi* (n.v.). All new records, however, have been checked against material sent by Professor Täckholm. It is thus hoped that the check list is now as complete as is humanly possible.

The phytogeographical deductions that can be drawn from any check list are dependent on three primary factors. These are:

- 1 The accuracy of the determinations.
- 2 The standard of taxonomic concepts.
- 3 The available information as to the overall distribution of every taxon.

Accuracy in determination is an obvious essential, especially in the case of a montane flora such as Jebel Marra where other members of the taxon may be a thousand kilometers away. In this work all the specimens examined from within the Jebel Marra survey area have been cited so that later workers will be able to check the determinations.

At our present stage of knowledge of the African flora it is not possible to expect any reasonable degree of uniformity in taxonomic concepts. Many polymorphic species, for example, still need to be properly investigated, while at the other extreme, many narrow species of uncertain status are maintained because there is insufficient material as yet available for their proper status to be ascertained.

Our knowledge of distribution is limited both by the degree of collecting in areal as well as numerical intensities and also on the availability of the collections for examination. Due to political circumstances Jebel Marra, for example, remained isolated until 1920 and consequently the flora was completely unknown until Admiral Lynes first visited the area, and has only been thoroughly collected in recent years. The bulk of the collections from our former African colonial territories are readily available in the herbaria at Kew and British Museum (Natural History), while those from former French territories are dispersed around a number of herbaria in France and poorly represented in the UK.

The writer was recently (June, 1971) given permission by the Ministry of Agriculture to visit the herbarium in the Faculté des Sciences de St Jérôme, University of Marseille, in order to examine the collections of Professor P. Quézel from Tibesti and Jebel Gurgeil. I am very grateful to the Ministry for granting me this facility and to Professor Quézel for his hospitality while in Marseille.

Two further factors for consideration are the time and the ability of the worker. The checking of the identity of a species throughout its distribution range is a very time consuming task. The worker is also expected to maintain a reasonably high standard of taxonomy throughout, including difficult and often unfamiliar groups of taxa still in need of major revisions.

Despite all these difficulties the resulting check list does show some quite interesting distribution patterns, leading to a better understanding of the phytogeographical history of the area.

Although regional floras are now being prepared for much of the continent of Africa there is no critical flora in preparation as yet for north-east Africa. For Jebel Marra it has been necessary to consult the complete

second edition of the Flora of West Tropical Africa and the partially completed, but perhaps more critical, Flora of Tropical East Africa, and on rare occasions the Flora du Congo-Belge et du Ruanda-Urundi and the Flora Zambesiaca. Where species have not been found in any of these major African works, Flora Europaea, Flora of Iraq, etc., have been consulted.

For the purposes of this check list synonymy has been limited to those names necessary to explain major taxonomic changes as well as those names used in the Sudan floras of F. W. Andrews and Broun & Massey. Cross reference has also been made to the Flora of Tropical Africa, Flora of West Tropical Africa and the Flora of Tropical East Africa, as well as Cufodontis's Enumeratio for Ethiopia. A few minor works of local importance have also been cited. For convenience the following abbreviations have been used:

Andr., F.P.S.	Andrews, F.W., Flowering Plants of the [Ango-Egyptian] Sudan (1950-56)
Broun & Massey, F.S.	Broun, A.F. & Massey, R.E., Flora of the Sudan (1929).
F.T.A.	Flora of Tropical Africa, auct. mult.
F.T.E.A.	Flora of Tropical East Africa, auct. mult.
F.W.T.A.	Flora of West Tropical Africa, ed. 2, vol. 1 by R. W. J. Keay, vols. 2 & 3 by F. N. Hepper.
Cuf., Enum.	Cufodontis, G., Enumeratio Plantarum Aethiopiae Spermatophyta (published as supplements to the Bull. Jard. Bot. État Brux. 1953-65, and Bull. Jard. Bot. Nat. Belg. 1966-72).

Quézel, Dossier 5

Quézel, P., Centre National de la Recherche Scientifique cooperative sur Programme No. 45, Dossier 5, Flore et végétation des plateaux du Darfur Nord-occidental et du jebel Gourgeil. (1969).

Sahni, Trees N. Sud.

Sahni, K.C., Important Trees of the Northern Sudan (1968).

Wickens, For. Bull.

Wickens, G.E., Some additions and corrections to F. W. Andrews, Flowering Plants of the Sudan. Sudan Forests Bulletin No. 14 (N.S.).

Maps have been prepared to show the distribution of all the montane and temperate taxa, as well as a selection of lowland taxa. These distributions are based on herbarium material seen at Kew, the British Museum (Natural History) and Marseille. In a few cases, additional locations have been obtained from the literature. Thus, many of the records for Chad, whose flora is very poorly represented in the UK herbaria, have been extracted from Lebrun *et al.* (1972). All these literature records are marked with an open circle '○' to distinguish them from those records for which specimens have been seen.

Chapter 16

Check list

Angiosperms

Ranunculaceae

1 **Clematis hirsuta** Guill. & Perr. in Fl. Seneg. 1:1 (1831); Milne-Redh. & Turrill, F.T.E.A. Ranunc. :6 (1952); Cuf., Enum. :107 (1953); Keay, F.W.T.A. ed. 2, 1:64 (1954). *Clematis glaucescens* Fresen. in Mus. Senck. 2:268 (1837); Broun & Massey, F.S. :51 (1929); Andr., F.P.S. 1:10 (1950). *Clematis inciso-dentata* A. Rich., Tent. Fl. Abyss. 1:2 (1847); Broun & Massey, F.S. :51 (1929); Andr., F.P.S. 1:10 (1950). *Clematis thunbergii* Steud., Nom. Bot. ed. 2, 1:380 (1840), *nom. nud.*, ex Harv., Thesp. Cap. 1:6, t.8 (1859); Oliver, F.T.A. 1:6 (1868). [*Clematis grata* sensu Oliver, F.T.A. 1:7 (1868); Broun & Massey, F.S. :51 (1929), *non* Wall. (1832).] *Clematis tibetica* Quézel in Bull. Soc. Hist. Nat. Afr. Nord. 48:86 (1957) & Miss. Bot. Tibesti :135, fig. 5 (1958) **syn. nov.** [*Clematis brachiata* sensu Wickens, For. Bull. 14 (N.S.) :2 (1969), *non* Thunb. (1800).] DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; lowland plain 1100 m; scandent shrub of woodland and river banks. *Lynes* 529; *Steele* s.n.; *Robertson* 7; *Wickens* 2585; *Kassas* 232b (KHU & CAI, *n.v.*). Vernacular name: (Fur) *indirri*; (Arabic) *shaaluk*. DISTRIBUTION Gambia to Cameroon and eastwards to Ethiopia and south through E. Africa to the Cape (Map 1). In the Sudan it occurs in the Red Sea Hills, Nuba Mountains and southern provinces. FLORISTIC CATEGORY Sudano-Zambezian Region. Note: As pointed out by Milne-Redhead & Turrill (loc. cit. 1952), *C. hirsuta* shows a wide range of variation. *C. tibetica* falls within the accepted range of variation and is accordingly reduced to synonymy. Exell & Milne-Redhead in Fl. Zambesiaca 1:92 (1960) suggest that *C. hirsuta* may prove to be conspecific with *C. brachiata* Thunb., an earlier name. Both the *C. hirsuta*/*C. brachiata* complex and the next species, *C. simensis*, are in need of critical field studies before any infraspecific taxa can be delimited.

2 **Clematis simensis** Fresen. in Mus. Senck. 2:267 (1837); Oliver, F.T.A. 1:6 (1868); Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S. :51 (1929); Andr., F.P.S. 1:10 (1950); Cuf., Enum. :109 (1953); Milne-Redh. & Turrill, F.T.E.A. Ranunc. :2 (1952); Keay, F.W.T.A. ed. 2, 1:64 (1964); Quézel, Dossier 5:100 (1969). DARFUR Jebel Marra, piedmont plain and massif, 1160–2800 m; *Lynes* 48, 85 & 102a; *Dandy* 144 (BM!); *Jackson* 2612; *Wickens* 1101, 1234 & 1715; *Kassas* 232, 293:6, 298, 558, 594, 646, 702 & 800 (all KHU & CAI, *n.v.*); *Sahni* 430. Vernacular name: (Fur) *salluk*; (Arabic) *shaaluk*. DISTRIBUTION Sudan (Darfur and the Imatongs) and Ethiopia southwards to Mozambique and Rhodesia, also in Cameroon and Fernando Po (Map 2). FLORISTIC CATEGORY Sudano-Zambezian Region.

3 **Nigella sativa** L., Sp. Pl. :534 (1753); Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S. :51 (1929); Andr., F.P.S. 1:12 (1950); Cuf., Enum. :106 (1953). DARFUR Jebel Marra, massif, 1950 m; cultivated herb. *Lynes* 30. Also recorded from Mellit to the north of Jebel Marra. *Lynes* 300. Seeds used as a condiment (Black Cumin). Only known in the Sudan from these two collections and not recorded since. DISTRIBUTION Probably native and cultivated in SW. Asia; cultivated in Europe and N. Africa, Ethiopia and along the southern borders of the Sahara. FLORISTIC CATEGORY ?Irano-Turanian Region, cultigen. Note: Probably introduced into Darfur from Egypt via the Derb el Arba'in, the old caravan route to Upper Egypt. Maire, Fl. Afr. Nord 11:41 (1964) reports that it often occurs as an escape in N. Africa, but then always fugacious. I have not seen it under cultivation on Jebel Marra, nor elsewhere in the Sudan; hence it can no longer be expected to occur even as an escape.

4 **Ranunculus multifidus** Forsk., Fl. Aegypt.-Arab. :102 (1775); Norman in Journ. Bot. 62:136 (1924); Andr., F.P.S. 1:12 (1950); Milne-Redh. & Turrill, F.T.E.A. Ranunc. :19, fig. 4/1 (1952); Cuf., Enum. :109 (1953); Keay F.W.T.A. ed. 2, 1:64 (1954). *Ranunculus pubescens* Thunb., Prodr. Pl. Cap. 2:94 (1800); Broun & Massey, F.S. :51 (1929). [*Ranunculus pinnatus* sensu Oliver in F.T.A. 1:9 (1868), excl. var. *extensa* Hook. f.; Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:136 (1924), *non* Poir. (1804).] DARFUR Jebel Marra, piedmont and massif, 1070–2670 m; common herb of moist sites. *Lynes* 17 (BM!), 85 & 101; *Macintosh* 58 & 114; *Steele* s.n.; *Dandy* 134 (BM!) & 160 (BM!); *Aglen* 22; *Jackson* 2618 & 2642; *Robertson* 115; *Wickens* 1106, 1243, 1537, 1689, 1698 & 1829. Vernacular name: (Fur) *daou korti* or *magno*; (Arabic) *keta*. DISTRIBUTION Sudan Republic (Jebel Marra and the Imatongs) and Ethiopia southwards to the Cape, also occurs in Nigeria, Madagascar and Arabia (Map 3). FLORISTIC CATEGORY Afrioriental and Zambezian Domains with Bauchi, Cameroon and Jebel Marra outliers.

Ceratophyllaceae

5 **Ceratophyllum demersum** L., Sp. Pl. :992 (1753); Skan in F.T.A. 6(2):326 (1917); Broun & Massey, F.S. :52 (1929); Andr., F.P.S. 1:14 (1950); Cuf., Enum. :106 (1953); Keay, F.W.T.A. ed. 2, 1:65 (1954). DARFUR Jebel Marra, piedmont, 1200 m; aquatic. *Wickens* 1536; *Kassas* 295 (KHU & CAI, *n.v.*). DISTRIBUTION Ghana to Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; widespread throughout the world (Map 4). Frequent in the Sudan along the Nile and its tributaries. FLORISTIC CATEGORY Cosmopolitan.

Nymphaeaceae

6 **Nymphaea caerulea** Savigny in Déc. Egypt. 1:74 (1798); Broun & Massey, F.S. :52 (1929); Andr., F.P.S. 1:14 (1950); Cuf., Enum. :105 (1953).

[*Nymphaea stellata* sensu Oliver, F.T.A. 1:52 (1868) pro parte quoad syn. *N. caerulea*, non Willd. (1799).]

DARFUR Jebel Marra, piedmont, 1160–1200 m; aquatic. *Wickens* 1019 & 2959; *Kassas* 313 (KHU & CAI) & 314 (KHU & CAI, n.v.); *Kamil* 1169. Vernacular name: (Arabic) *sutteib*. The rootstock is reputed to be edible.

DISTRIBUTION Sudan Republic and Ethiopia southwards to the Cape; also in Egypt *vide* Fl. Zambes. (Map 5). Widespread in the Southern provinces of the Sudan.

FLORISTIC CATEGORY Afriental and Zambeziian Domains.

7 **Nymphaea lotus** L., Sp. Pl. :511 (1753) emend.; Oliver, F.T.A. 1:52 (1868); Broun & Massey, F.S. :52 (1929); Andr., F.P.S. 1:14 (1950); Cuf., Enum. :105 (1953); Keay, F.W.T.A. ed. 2, 1:66 (1954).

DARFUR Lowland plain, 670–1020 m; aquatic. *Wickens* 2298 & 2946.

DISTRIBUTION Senegal to Ethiopia and south to the Cape; widespread in the tropics and subtropical regions of the Old World (Map 6). Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

8 **Nymphaea maculata** Schum. & Thonn., Guin. Pl. :247 (?1827) & in Kongel. Dansk. Vid. Selsk. Nat. Math. Afh. 4:21 (1829); Keay, F.W.T.A. ed. 2, 1:66 (1954).

DARFUR Lowland plain, 1020 m; aquatic. *Wickens* 1361 & 2297.

DISTRIBUTION Widely scattered in tropical Africa from Senegal across to the Sudan and southwards to Zambia (Map 7). Only recorded from Darfur and Bahr el Ghazal provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeziian Region and Guinea Domain.

Menispermaceae

9 **Chasmanthera dependens** Hochst. in Flora 27:21 (1844); Oliver, F.T.A. 1:41 (1868); Broun & Massey, F.S. :53 (1929); Andr., F.P.S. 1:15, fig. 14 (1950); Cuf., Enum. :115 (1954); Keay, F.W.T.A. ed. 2, 1:74 (1954); Troupin, F.T.E.A. Menisp. :17, fig. 5 (1956); Quézel, Dossier 5:100 (1969).

DARFUR Lowland Plain, 1020 m; shrub of rocky hill slopes.

Wickens 1977.

DISTRIBUTION Sierra Leone to Cameroon and eastwards to Ethiopia and south to northern Zambia (Map 8). In the Sudan it occurs in Darfur and the southern provinces.

FLORISTIC CATEGORY Sudano-Zambeziian Region and Guinea Domain.

10 **Cissampelos mucronata** A. Rich. in Fl. Seneg. 1:11 (1831); Broun & Massey F.S. :54 (1929); Andr., F.P.S. 1:17 (1950); Cuf., Enum. :114 (1954); Keay, F.W.T.A. ed. 2, 1:75 (1954); Troupin, F.T.E.A. Menisp. :27 (1956).

[*Cissampelos pareira* sensu Oliver in F.T.A. 1:46 (1868), pro parte, non L. (1753); Broun & Massey, F.S. :53 (1929).]

DARFUR Lowland plain, 600 m; river banks. *Wickens* 2017.

DISTRIBUTION Widely distributed in tropical and southern Africa from Senegal across to Ethiopia and south to SW. Africa, Transvaal and Natal (Map 9). Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeziian Region and Guinea Domain.

Turneraceae

11 **Wormskioldia pilosa** (Willd.) Schweinf. ex Urban in Jahrb. Kgl. Bot. Gart. Mus. Berl. 2:54 (1833); Broun & Massey, F.S. :56 (1929); Andr., F.P.S. 1:30, fig. 23 (1950); Lewis, F.T.E.A. Turn. :11 (1954); Keay, F.W.T.A. ed. 2, 1:85, fig. 26 (1954); Cuf., Enum. :598 (1959).

Raphanus pilosus Willd., Sp. Pl. 3:562 (1801).

Wormskioldia heterophylla Schum. & Thonn., Beskr. Guin. Pl. :165 (1827); Masters in F.T.A. 2:502 (1871).

DARFUR Lowland plain, 1000–1100 m; savanna. *Lynes* 554; *Wickens* 1958 & 2011.

DISTRIBUTION Senegal to Cameroon and eastward to the Sudan and south to northern Zambia (Map 10). Widely scattered through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeziian Region.

Capparidaceae

12 **Boscia salicifolia** Oliver, F.T.A. 1:93 (1868), excl. specim. *Welwitsch*; Broun & Massey, F.S. :61 (1929); Andr., F.P.S. 1:32, fig. 25 (1950); Cuf., Enum. :130 (1954); Keay, F.W.T.A. ed. 2, 1:93 (1954); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :52 (1964).

DARFUR Lowland plain, 1020 m; shrub of stony, shallow soils.

Wickens 1737, 2831 & 2834; *Kamil* 1204. Vernacular name: (Fur) *tabi* or *tebbi*; (Arabic) *seban*. Fruit edible.

DISTRIBUTION From Senegal to Nigeria eastwards to Ethiopia and southwards through E. Africa to Mozambique, Rhodesia and Botswana (Map 11). Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeziian Region.

13 **Boscia senegalensis** (Pers.) Lam. ex Poir. in DC., Prodr. 1:244 (1824); Oliver, F.T.A. 1:92 (1868); Andr., F.P.S. 1:31 (1950); Keay, F.W.T.A. ed. 2, 1:93 (1954); Quézel, Dossier 5:100 (1969).

Podoria senegalensis Pers., Syn. Pl. 2:5 (1806).

Boscia octandra Hochst. ex Radlk. in Sitz. Math.-Phys. Acad. Muench. 15:62 (1884); Broun & Massey, F.S. :60 (1929); Cuf., Enum. :129 (1954).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; savanna. *Lynes* 536; *Wickens* 970. Vernacular name: (Fur) *muged* or *morga*, pl. *morganga*; (Arabic) *mukheid*. The fruits are eaten by boys and birds. Camels may browse the shrub but because of obnoxious smell of the crushed leaves, it is not eaten by other stock.

DISTRIBUTION From Mauritania and Senegal eastwards to Ethiopia (Map 12). Widely distributed in the northern and central provinces of the Sudan, less common further south.

FLORISTIC CATEGORY Sahelian Domain.

14 **Cadaba farinosa** Forsk., Fl. Aegypt.-Arab. :68 (1775); Oliver, F.T.A. 1:89 (1868); Broun & Massey, F.S. :62 (1929); Andr., F.P.S. 1:35, fig. 28 (1950); Cuf., Enum. :133 (1954); Keay, F.W.T.A. ed. 2, 1:90 (1954); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :75 (1964); Quézel, Dossier 5:101 (1969); subsp. **farinosa**; Elffers, Graham & DeWolf, F.T.E.A. Capparid. :75 (1964).

DARFUR Jebel Marra, piedmont and massif, 1180–1200 m; lowland plain, 1020–1050 m; climbing shrub of alluvial soils and rocky hill slopes. *Macintosh* 57; *Wickens* 968, 1507, 1854 & 2813.

Vernacular name: (Fur) *mergel*; (Arabic) *sareh*. Browsed by stock. DISTRIBUTION From Senegal to Nigeria across to Ethiopia, Somali Republic and E. Africa (Map 13); also in Egypt, Arabia and India. Widely distributed in the northern and central provinces of the Sudan, less common further south.

FLORISTIC CATEGORY Sahelian, Sudanian, Afriental, South Arabian Domains and Saharo-Sindian Region.

15 **Cadaba glandulosa** Forsk., Fl. Aegypt.-Arab. :68 (1775); Oliver, F.T.A. 1:89 (1868); Broun & Massey, F.S. :61 (1929); Andr., F.P.S. 1:34, fig. 27 (1950); Cuf., Enum. :133 (1954); Keay, F.W.T.A. ed. 2, 1:90 (1954); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :74 (1964); Quézel, Dossier 5:101 (1969).

DARFUR Lowland plain, 800 m; cushion-shrub in *Acacia mellifera* thorn scrub. *Francis* 80.

DISTRIBUTION From Mali eastwards to the Somali Republic and E. Africa (Map 14); also in Arabia. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sahelian, Sudanian, Afriental and South Arabian Domains.

16 **Capparis cartilaginea** Decne. in Ann. Sci. Nat. Paris II, 3:273 (1835); Cuf., Enum. :126 (1954); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :59, fig. 10/3-6 (1964); Wickens, For. Bull. 14(N.S.) :3 (1969).

Capparis galeata Fresen. in Mus. Senck. 2:111 (1836); Oliver, F.T.A. 1:95 (1868); Broun & Massey, F.S. :59 (1929); Andr., F.P.S. 1:39 (1950).

DARFUR Jebel Marra, massif, 1780 m; *Kassas* 856 (KHU & CAI!). DISTRIBUTION Chad (Tibesti), Sudan Republic (Jebel Marra and the Red Sea Hills), Somali Republic, Kenya and Tanzania; also the Middle East and Pakistan.

FLORISTIC CATEGORY Afriental and Zambeian Domains and Saharo-Sindian Region.

17 **Capparis decidua** (Forsk.) Edgew. in Journ. Linn. Soc. Bot. 6:184 (1862); Broun & Massey, F.S. :60 (1929); Andr., F.P.S. 1:39, fig. 31 (1950); Cuf., Enum. :126 (1954); Keay, F.W.T.A. ed. 2, 1:89 (1954); Quézel, Dossier 5:101 (1969).

Sodada decidua Forsk., Fl. Aegypt.-Arab. :81 (1775).

Capparis aphylla Hayne ex Roth, Nov. Pl. Sp. :238 (1821); Oliver, F.T.A. 1:95 (1868); Broun & Massey, F.S. :60 (1929).

DARFUR Lowland plain, 750 m; dominant shrub on alluvial clays. *Wickens* 960. Vernacular name: (Fur & Arabic) *tundub*. Fruit edible.

DISTRIBUTION From Mauritania and Senegal eastwards to Ethiopia (Map 15); also in Arabia, Israel, India and Afghanistan. Widely distributed in the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sahelian Domain and Saharo-Sindian Region.

18 **Capparis fascicularis** DC., Prodr. 1:248 (1824); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :65 (1964). var. **fascicularis**; Elffers, Graham & DeWolf, F.T.E.A. Capparid. :65 (1964).

Capparis rothii Oliver, F.T.A. 1:97 (1868); Broun & Massey, F.S. :60 (1929); Andr., F.P.S. 1:41, fig. 34 (1950); Cuf., Enum. :127 (1954); Keay, F.W.T.A. ed. 2, 1:90 (1954); Quézel, Dossier 5:101 (1969).

Capparis somalensis Gilg in Ann. Ist. Bot. Roma 6:90 (1896); Cuf., Enum. :128 (1954).

Capparis jodotricha Gilg & Bened. in Engl., Bot. Jahrb. 53:196 (1915); Broun & Massey, F.S. :60 (1929).

DARFUR Jebel Marra, piedmont, 1150 m; lowland plain, 950-1020 m; woody climber of alluvial soils. *Wickens* 1081, 1114 & 1320. Vernacular name: (Fur) *gurso*; (Arabic) *tundub*. Fruit eaten by camels.

DISTRIBUTION From Gambia eastwards to Ethiopia, Uganda and Kenya (Map 16). Widely distributed in central and southern Sudan.

FLORISTIC CATEGORY Sahelian and Afriental Domains.

19 **Capparis micrantha** A. Rich., Tent. Fl. Abyss. 1:31 (1841); Oliver, F.T.A. 1:98 (1868); Broun & Massey, F.S. :59 (1929); Andr., F.P.S. 1:42 (1950); Cuf., Enum. :124 (1954).

DARFUR Jebel Marra. *Kassas* 145 (KHU & CAI!).

DISTRIBUTION Southern provinces of the Sudan Republic and Ethiopia.

FLORISTIC CATEGORY Afriental Domain.

20 **Capparis sepiaria** L., Sp. Pl. ed. 2, 1:720 (1762); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :63 (1964).

var. **fischeri** (Pax) DeWolf in Kew Bull. 16:81 (1962); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :64 (1964).

[*Capparis corymbosa* sensu Oliver, F.T.A. 1:96 (1868); Broun & Massey, F.S. :59 (1929); Andr., F.P.S. 1:42 (1950); Keay, F.W.T.A. ed. 2, 1:90 (1954), *non* Lam. (1785).]

Capparis fischeri Pax in Engl., Bot. Jahrb. 14:298 (1891).

Capparis djurica Gilg & Bened. in Engl., Bot. Jahrb. 53:192 (1915); Broun & Massey, F.S. :60 (1929); Andr., F.P.S. 1:42 (1950).

[*Capparis fascicularis* DC. var. *fascicularis* sensu Wickens, For. Bull. 14(N.S.) :3 (1969).]

DARFUR Jebel Marra, massif, 1350-1600 m; lowland plain 760-1020 m; savanna. *Dandy* 39 (BM!); *Wickens* 1501, 1508, 2905 & 2932.

DISTRIBUTION From Senegal and N. Nigeria eastwards to the central and southern provinces of the Sudan and into Kenya and Tanzania (Map 17).

FLORISTIC CATEGORY Sahelian and Afriental Domains.

21 **Cleome monophylla** L., Sp. Pl. :672 (1753); Oliver, F.T.A. 1:76 (1868); Broun & Massey, F.S. :57 (1929); Andr., F.P.S. 1:44 (1950); Cuf., Enum. :122 (1954); Keay, F.W.T.A. ed. 2, 1:87 (1954); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :5, fig. 2/19 (1964); Quézel, Dossier 5:101 (1969).

DARFUR Jebel Marra, massif and piedmont, 1160-*c.* 1500 m; lowland plain, 1020-1100 m; weed of arable land and waste places. *Lynes* 534; *Aglen* 36; *Wickens* 1883, 1957 & 1972. Vernacular name: (Fur) *samel marri*; (Arabic) *yaseem*. Leaves eaten in salads and stews.

DISTRIBUTION From Senegal eastwards to Ethiopia and southwards through E. Africa to the Cape (Map 18); also in India and Ceylon. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian and Saharo-Sindian Regions.

22 **Crateva adansonii** DC., Prodr. 1:243 (1824); Broun & Massey, F.S. :58 (1929); Andr., F.P.S. 1:47, fig. 36 (1950); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :20, fig. 4 (1964); Sahni, Trees N. Sudan :10, fig. 2 (1968).

[*Crateva religiosa* sensu Oliver, F.T.A. 1:99 (1868); Cuf., Enum. :125 (1954); Keay, F.W.T.A. ed. 2, 1:90 (1954); *non* Forst. f. (1786).]

subsp. **adansonii**; Jacobs in Blumea 12:197, fig. 4 (1964).

DARFUR Lowland plain, 760-1020 m; riverine tree. *Wickens* 1498, 2901 & 2950. Vernacular name: (Fur) *angurgna*; (Arabic) *dabkar*. An infusion of the bark is used for treating stomach ache; a paste from the bark is used for poulticing swellings. The fruit is edible.

DISTRIBUTION From Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Zambia (Map 19). Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

Note: Jacobs (1964) in his monograph of the genus *Crateva* suggests that the genus arose in Gondwanaland together with the closely related African genera *Ritchiea*, *Euadenia*, *Bachmannia* and *Cladostemon*. The uniformity of the only African species of *Crateva*, *C. adansonii*, appears to exclude the possibility of these genera having arisen in Africa; the centre of speciation for *Crateva* is believed to be SE. Asia.

23 **Gynandropsis gynandra** (L.) Briq. in Ann. Conserv. Jard.

Bot. Genève 17:382 (1914); Broun & Massey, F.S. :58 (1929); Andr., F.P.S. 1:49, fig. 38 (1950); Cuf., Enum. :124 (1954); Keay, F.W.T.A. ed. 2, 1:88 (1954); DeWolf in F.T.E.A. Capparid. :18, fig. 3 (1964); Quézel, Dossier 5:101 (1969).

Cleome gynandra L., Sp. Pl. :671 (1753).

Gynandropsis pentaphylla (L.) DC., Prodr. 1:238 (1824); Oliver, F.T.A. 1:82 (1868).

DARFUR Lowland plain, 1020-1100 m; arable weed. *Lynes* 532; *Wickens* 1738. Vernacular name: (Fur) *temelga*; (Arabic) *tamalaika*. The leaves are used as a vegetable.

DISTRIBUTION From Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Zambia (Map 19). Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

Note: Jacobs (1964) in his monograph of the genus *Crateva* suggests that the genus arose in Gondwanaland together with the closely related African genera *Ritchiea*, *Euadenia*, *Bachmannia* and *Cladostemon*. The uniformity of the only African species of *Crateva*, *C. adansonii*, appears to exclude the possibility of these genera having arisen in Africa; the centre of speciation for *Crateva* is believed to be SE. Asia.

23 **Gynandropsis gynandra** (L.) Briq. in Ann. Conserv. Jard.

Bot. Genève 17:382 (1914); Broun & Massey, F.S. :58 (1929); Andr., F.P.S. 1:49, fig. 38 (1950); Cuf., Enum. :124 (1954); Keay, F.W.T.A. ed. 2, 1:88 (1954); DeWolf in F.T.E.A. Capparid. :18, fig. 3 (1964); Quézel, Dossier 5:101 (1969).

Cleome gynandra L., Sp. Pl. :671 (1753).

Gynandropsis pentaphylla (L.) DC., Prodr. 1:238 (1824); Oliver, F.T.A. 1:82 (1868).

DARFUR Lowland plain, 1020-1100 m; arable weed. *Lynes* 532; *Wickens* 1738. Vernacular name: (Fur) *temelga*; (Arabic) *tamalaika*. The leaves are used as a vegetable.

DISTRIBUTION From Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Zambia (Map 19). Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

DISTRIBUTION Throughout most of Africa; also in Madagascar, Seychelles, tropical Asia and introduced into America. A widespread weed of cultivation and waste places throughout the Sudan.

FLORISTIC CATEGORY A pantropical weed.

Note: I have followed the editors of F.T.E.A. who, for the sake of uniformity of treatment in other African floras amended DeWolf's original placing of *Gynandropsis* in *Cleome*. Iltis in Brittonia 12:279–294 (1960) regards *Cleome gynandra* as being a very distinctive and highly polymorphic species occupying a very isolated position within the genus, belonging to the monotypic Section *Gymnogonia* R.Br. The species is unusual in having the staminal vascular strands fused with the vascular cylinder of the gynophore for a considerable distance and only becoming free a short distance before entering the divergent, free portion of the filaments.

24 ***Maerua angolensis* DC.**, Prodr. 1:254 (1824); Oliver, F.T.A. 1:86 (1868); Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S. :62 (1929); Andr., F.P.S. 1:52, fig. 39 (1950); Keay, F.W.T.A. ed. 2, 1:88 (1954); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :28 (1964).

DARFUR Jebel Marra, piedmont and foothills, 1160–1600 m; savanna. *Lynes* 103; *Macintosh* 10; *Wickens* 972 & 3008. Vernacular name: (Fur) *sinnan* or *zele*; (Arabic) *shagar el dud* or *shagar el zeraaf*.

DISTRIBUTION From Senegal to Nigeria eastwards to Ethiopia and the Somali Republic and southwards through E. Africa to Natal, Botswana, Angola and SW. Africa (Map 20). Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

25 ***Maerua oblongifolia* (Forsk.) A. Rich.**, Tent. Fl. Abyss. 1:32, t.6 (1847); Oliver, F.T.A. 1:85 (1868); Broun & Massey, F.S. :63 (1929); Andr., F.P.S. 1:52 (1950); Cuf., Enum. :138 (1954); Keay, F.W.T.A. ed. 2, 1:89 (1954); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :37 (1964).

Capparis oblongifolia Forsk., Fl. Aegypt.-Arab. :99 (1775).

DARFUR Jebel Marra, piedmont; lowland plains, 1100 m; savanna. *Lynes* 533; *Macintosh* s.n.

DISTRIBUTION From Senegal to Nigeria and eastwards to Ethiopia and Somali Republic, Uganda and Kenya; also in Arabia (Map 21). Widely distributed in the Sudan.

FLORISTIC CATEGORY Sahelian, Sudanian, Afriental and South Arabian Domains.

26 ***Maerua pseudopetalosa* (Gilg & Bened.) DeWolf** in Kew Bull. 16:82 (1962); Elffers, Graham & DeWolf, F.T.E.A. Capparid. :43, fig. 7 (1954); Wickens For. Bull. 14(N.S.) :3 (1969). *Courbonia virgata* Brongn. in Bull. Soc. Bot. Fr. 7:901 (1860); Oliver, F.T.A. 1:88 (1868); Broun & Massey, F.S. :61 (1929); Andr., F.P.S. 1:46 (1950); Cuf., Enum. :132 (1954); Keay, F.W.T.A. ed. 2, 1:95 (1954), *non Maerua virgata* Gilg (1903). *Courbonia pseudopetalosa* Gilg & Bened. in Engl., Bot. Jahrb. 53:217 (1915).

DARFUR Lowland plain, 1020 m; savanna suffrutescens. *Wickens* 971 & 1298. Vernacular name: (Arabic) *kordale*.

DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic and Kenya (Map 22). Widely distributed throughout the Sudan *vide* F.W. Andr., specimens only seen from the southern provinces.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

Cruciferae

27 ***Capsella bursa-pastoris* (L.) Medic.**, Pflanzengatt. :85 (1792); Oliver, F.T.A. 1:68 (1868); Cuf., Enum. :154 (1954); Wickens, For. Bull. 14(N.S.) :4 (1969).

Thlaspi bursa-pastoris L., Sp. Pl. :647 (1753).

DARFUR Jebel Marra, massif, 2300–2650 m; arable weed.

Jackson 4071; *Wickens* 1235 & 2683.

DISTRIBUTION Sudan (Jebel Marra), Ethiopia, E. Africa, Rhodesia and S. Africa (Map 23); widespread in the temperate regions of the world.

FLORISTIC CATEGORY Afro-montane; a pan-temperate weed of cultivation.

28 ***Farsetia longisiliqua* Decne.** in Ann. Sci. Nat. II, 4:69 (1835); Oliver, F.T.A. 1:62 (1868); Broun & Massey, F.S. :64 (1929); Andr., F.P.S. 1:57 (1950); Cuf., Enum. :156 (1954). DARFUR Lowland plain, 1100 m; weed. *Lynes* 531.

DISTRIBUTION Northern and central provinces of Sudan Republic, Ethiopia and Somali Republic; also in Egypt, Arabia and Socotra. (Map 24).

FLORISTIC CATEGORY Sahelian, Afriental and South Arabian Domains.

29 ***Farsetia stenoptera* Hochst.** in Flora 31:176 (1848); Oliver, F.T.A. 1:62 (1868); Andr., F.P.S. 1:57 (1950); Cuf., Enum. :157 (1954); Keay, F.W.T.A. ed. 2, 1:97 (1954); Quézel, Dossier 5:102 (1969).

Farsetia grandiflora Fourn. in Bull. Soc. Bot. Fr. 11:55 (1864); Oliver, F.T.A. 1:62 (1868); Broun & Massey, F.S. :64 (1929).

DARFUR Lowland plain, 1020–1150 m; savanna. *Macintosh* 7; *Wickens* 1999 & 2277.

DISTRIBUTION From Mali and Upper Volta eastwards to the Sudan, Somali Republic and E. Africa (Map 25). Widely distributed in Darfur and Kordofan provinces of the Sudan.

FLORISTIC CATEGORY Sahelian and Afriental Domains.

30 ***Lepidium sativum* L.**, Sp. Pl. 644 (1753); Oliver, F.T.A. 1:69 (1868); Broun & Massey, F.S. :65 (1929); Andr., F.P.S. 1:59 (1950); Keay, F.W.T.A. ed. 2, 1:98 (1954).

DARFUR Jebel Marra, massif. *Drar* 2357 (CAI!).

DISTRIBUTION Mali to Nigeria eastwards to Ethiopia; widespread throughout the temperate regions. Occurs in the central provinces of the Sudan, sometimes cultivated.

FLORISTIC CATEGORY ?Mediterranean cultigen.

31 ***Nasturtium microphyllum* Boenn. ex Reichenb.**, Fl. Germ. Excurs. :683 (1832); Cuf., Enum. :152 (1954).

Rorippa microphylla (Boenn. ex Reichenb.) Hyl. in Rep. Univ. Inst. Appl. Sci. Revjavik, Dept. Agric., Ser. B, No 3 :109 (1948).

DARFUR Jebel Marra, massif, 2150 m; aquatic. *Steele* 30. Used to cure fevers.

DISTRIBUTION Sudan (Jebel Marra) and scattered localities in Ethiopia and Kenya (Map 26); also in Europe.

FLORISTIC CATEGORY Central European and Boreo-European Regions.

32 ***Nasturtium officinale* R.Br.** in Ait., Hort. Kew. ed. 2, 4:111 (1812); Oliver, F.T.A. 1:58 (1868); Andr., F.P.S. 1:60 (1950); Cuf., Enum. :152 (1954).

Rorippa nasturtium-aquaticum (L.) Hayek, Sched. Fl. Stirp. Exs. :22 (1905); Keay, F.W.T.A. ed. 2, 1:97 (1954); Wickens, For. Bull. 14(N.S.) :4 (1969).

Nasturtium sp., Norman in Journ. Bot. 62:136 (1924).

DARFUR Jebel Marra, massif, 1340–2000 m; aquatic. *Lynes* 22 (BM!); *Dandy* 149 (BM!); *Wickens* 2857.

DISTRIBUTION Extending from Ethiopia through E. Africa to the Cape with scattered records from Mali, Cameroon and the Sudan (Jebel Marra) (Map 26); also in temperate Europe, Asia and North Africa, probably introduced into South Africa, Australia, New Zealand and America.

FLORISTIC CATEGORY Palaearctic with Afro-montane extension.

Note: The two species may be separated according to the following key taken from Fl. Europ. 1:284 (1964).

Siliqua 13–18 mm long, seeds arranged biserially *N. officinale*.

Siliqua 16–18 mm long, seeds arranged uniserially *N. microphyllum*.

33 **Raphanus sativus** L., Sp. Pl. :669 (1753); Oliver, F.T.A. 1:73 (1868); Broun & Massey, F.S. :65 (1929); Andr., F.P.S. 1:54 (1950); Cuf., Enum. :150 (1954).

DARFUR Lowland plain, 1020 m; cultivated herb. *Wickens* 1144 & 1742. The leaves are eaten in salads, roots used as a vegetable.

DISTRIBUTION Widely cultivated throughout the world.

FLORISTIC CATEGORY Cosmopolitan cultigen.

Polygalaceae

34 **Polygala abyssinica** R.Br. ex Fresen. in Mus. Senck. 2:273 (1837); Oliver, F.T.A. 1:130 (1868); Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :67 (1929); Andr., F.P.S. 1:71 (1950); Cuf., Enum. :405 (1956); Quézel, Dossier 5:102 (1969).

DARFUR Jebel Marra, massif, 1765–3000 m; suffruticose herb of upland grassland. *Lynes* s.n. (BM!), 69 (BM!), 92, 104 (BM!) & 104a (BM!); *Rugman* s.n.; *Macintosh* 2; *Sandison* 43, 44 & 45 (all BM!); *Dandy* 107 & 190 (both BM!); *Jackson* 2588; *Robertson* 139; *Wickens* 990, 1222, 1226 & 2652.

DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra, the Imatongs and the Red Sea Hills), Ethiopia and E. Africa (Map 27); also in Arabia and Afghanistan.

FLORISTIC CATEGORY Afro-montane and Himalayan Regions.

35 **Polygala arenaria** Willd. in L., Sp. Pl. ed. 4, 3:880 (1802) & in DC., Prodr. 1:326 (1802); Oliver, F.T.A. 1:128 (1868), pro parte; Broun & Massey, F.S. :68 (1929); Andr., F.P.S. 1:72 fig. 50 (1950); Keay, F.W.T.A. ed. 2, 1:112, fig. 37 (1954) Cuf., Enum. :406 (1956).

DARFUR Jebel Marra, piedmont and massif, 1160–1340 m; savanna. *Wickens* 2201, 2503 & 2729; *Kassas* 293:72b (KHU & CAI!).

DISTRIBUTION From Senegal to Cameroon and eastwards to Ethiopia and south through E. Africa to Malawi and Mozambique. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

36 **Polygala persicariifolia** DC., Prodr. 1:326 (1802); Oliver, F.T.A. 1:129 (1868), pro parte; Broun & Massey, F.S. :67 (1929); Andr., F.P.S. 1:72 (1950); Keay, F.W.T.A. ed. 2, 1:113 (1954); Cuf., Enum. :409 (1950).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; savanna. *Wickens* 2186 & 2518.

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia and Mozambique; also in tropical Asia. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

37 **Polygala petitiana** A. Rich., Tent. Fl. Abyss. 1:37 (1847); Oliver, F.T.A. 1:133 (1868); Andr., F.P.S. 1:70 (1950); Keay, F.W.T.A. ed. 2, 1:112 (1954); Cuf., Enum. :409 (1956).

DARFUR Jebel Marra, piedmont and massif, 1160–1340 m; savanna. *Wickens* 2501 & 2728.

DISTRIBUTION From Ghana to Cameroon and eastwards to Ethiopia and south through E. Africa to Rhodesia and Angola. Widely distributed in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

38 **Securidaca longepedunculata** Fresen. in Mus. Senck. 2:275 (1837); Oliver, F.T.A. 1:134 (1868); Broun & Massey, F.S. :68 (1929); Andr., F.P.S. 1:75, fig. 51 (1950); Keay, F.W.T.A. ed. 2, 1:110 (1954); Cuf., Enum. :411 (1956).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m;

savanna. *Steele* 1; *Wickens* 1657 & 2082; *Kamil* 1069. Vernacular name: (Fur) *sigrigna*; (Arabic) *alali*.

DISTRIBUTION Widely distributed throughout tropical and southern Africa from Senegal eastwards to Ethiopia and southwards to the Transvaal and SW. Africa (Map 28). Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Crassulaceae

39 **Crassula pentandra** (Royle ex Edgew.) Schoenl. in Engl. & Prantl, Pflanzenfam. 3, 2A:37 (1890); Andr., F.P.S. 1:76 (1950); Keay, F.W.T.A. ed. 2, 1:116 (1954); Quézel, Dossier 5:103 (1969).

Tillaea pentandra Royle ex Edgew. in Trans. Linn. Soc. 20:50 (1846); Britten in F.T.A. 2:386 (1871); Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S. :68 (1929).

DARFUR Jebel Marra, massif, 1900–3000 m; upland meadow and rock crevices. *Lynes* 110 & 111 (BM!); *Jackson* 2342; *Wickens* 2143, 2378, 2434 & 2823; *Kassas* 421, 480 & 627 (all KHU & CAI!).

DISTRIBUTION Cameroon Mtn. and uplands of Sudan, Ethiopia, E. Africa, Malawi, Zambia, Rhodesia and Angola (Map 29); possibly from Socotra, Arabia and India. Only recorded in the Sudan from Jebel Marra and the Red Sea Hills.

FLORISTIC CATEGORY Afro-montane.

Note: According to Suessenguth & Merxmüller in Mitt. Bot. Staatssamml. Münch. 1(3):69–94 (1951), the African material differs from the Indian plant which has spatulate nectar scales, and is nearer to *C. schimperi* C. A. Mey., which has obtriangular, long stipitate nectar scales. The group requires a critical revision when more material becomes available.

40 **Crassula pharnaceoides** Fischer & C. A. Mey. in Ind. Sem. Hort. Petrop. 8:56 (1841); Cuf., Enum. :170 (1954); Keay, F.W.T.A. ed. 2, 1:116 (1954).

Tillaea pharnaceoides (Fischer & C. A. Mey.) Steudel, Nom. Bot. ed. 2, 2:687 (1841); Britten in F.T.A. 2:387 (1871).

DARFUR Jebel Marra, massif, 2300–2450 m; upland grassland. *Wickens* 2413 & 2535.

DISTRIBUTION Cameroon Mtn., Sudan Republic, Ethiopia, E. Africa (Map 30); also in Arabia and NW. India. Not previously cited for the Sudan. Only known from Jebel Marra and the Red Sea Hills.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions (distribution still imperfectly understood).

Kalanchoë lanceolata (Forsk.) Pers., Syn. 1:446 (1805); Andr., F.P.S. 1:79 (1950); Keay, F.W.T.A. ed. 2, 1:118 (1954); Cuf., Enum. :168 (1954) & in Webbia 19:728 (1965).

Cotyledon lanceolata Forsk., Fl. Aegypt.-Arab. :89 (1775).

Kalanchoë brachycalyx A. Rich., Tent. Fl. Abyss. 1:312 (1847);

Britten in F.T.A. 2:396 (1871); Cuf., Enum. :166 (1954).

This is a distinctive species as well as being the most widely distributed of the African species. Cufodontis (1965) recognizes two varieties, based on calyx characters:

Calyx lobes longer than the tube var. *lanceolata*

Calyx lobes shorter or subequal to the tube var. *glandulosa*

41 var. **lanceolata**; Cuf. in Webbia 19:729 (1965).

Kalanchoë modesta Kotschy & Perr., Pl. Tinn. :18 (1867); Andr., F.P.S. 1:79 (1950); Quézel, Dossier 5:102 (1969).

DARFUR Jebel Marra, piedmont, 1160 m; gallery forest. *Wickens* 2828.

DISTRIBUTION N. Nigeria, Sudan Republic (southern provinces), Ethiopia, E. Africa, Mozambique, Angola and SW. Africa (Map 31); also in Arabia and India.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

42 var. **glandulosa** (Hochst. ex A. Rich.) Cuf. in Webbia 19:730 (1965).

Kalanchoë glandulosa Hochst. ex A. Rich., Tent. Fl. Abyss. 1:312 (1847); Britten in F.T.A. 2:396 (1871).

DARFUR Jebel Marra, piedmont, 1170 m; lowland plain, 900 m; savanna. *Wickens* 2797 & 2856.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Uganda, Kenya and Tanzania (Map 31); also in Arabia and India.

FLORISTIC CATEGORY Afriental Domain and Saharo-Sindian Region.

43 **Umbilicus botryoïdes** Hochst. ex A. Rich., Tent. Fl. Abyss. 1:308 (1847); Broun & Massey, F.S. :69 (1929); Andr., F.P.S. 1:79, fig. 53 (1950); Cuf., Enum. :166 (1954); Keay F.W.T.A. ed. 2, 1:119, fig. 40 (1954); Quézel, Dossier 5:102 (1969).

[*Cotyledon umbilicus* sensu Britten in F.T.A. 2:398 (1871); Norman in Journ. Bot. 62:136 (1924), non L. (1753).]

DARFUR Jebel Marra, massif, 1900–3000 m; rock crevices. *Lynes* 109 (BM!), 110 & 111; *Macintosh* 74, *Wickens* 1841, 2390 & 2636; *Kassas* 589 & 645 (both KHU & CAI!).

DISTRIBUTION Cameroon Mtn., Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia, and the highlands of E. Africa (Map 32).

FLORISTIC CATEGORY Afro-montane.

Vahliaceae

This monotypic family of five distinct species was segregated from the Saxifragaceae by Dandy in Hutchinson (1960)¹ on account of its anomalous position therein. It differs from the Saxifragaceae in having a unilocular ovary with two large placentas hanging from the apex of the ovary as against 1–3 loculi with axile placentation; it also has opposite instead of alternate leaves. Bullock (1966)² resuscitated Adanson's earlier name *Bistella* (1763), which had previously been overlooked to replace the better known *Vahlia* of Thunberg (1782). At the same time, Bullock reduced the number of species from c. 8 to 3. Five species are now recognized in the recent revision by Bridson (1975)³. The name *Vahlia* was conserved in Taxon 17:326 (1968).

44 **Vahlia dichotoma** (Murray) Kuntze, Rev. Gen. :227 (1891); Andr., F.P.S. 1:80, fig. 55 (1950); Keay, F.W.T.A. ed. 2, 1:120 (1954); Bridson in Kew Bull. 30:164, Fig. 1/U-Z (1975) & F.T.E.A. Vahliac. :2, fig. 1/19–24 (1975).

Heuchera dichotoma Murray, Comm. Gotting. 64, t.1 (?1773).

Vahlia oldenlandioides Roxb., Fl. Ind. 2:89 (1832); Oliver, F.T.A. 2:384 (1871); Broun & Massey, F.S. :69 (1929) *nom. illegit.*

Vahlia cordofana Hochst. in Flora 24(1), Intell. :43 (1841) *nom. nud.*

Bistella dichotoma (Murray) Bullock in Acta Bot. Neerl. 15:85 (1966).

DARFUR Lowland plain, 975–1020 m; weed. *Wickens* 1147, 1754, 1790 & 2949.

DISTRIBUTION From Mauritania to N. Nigeria across to the Sudan and in Tanzania, Mozambique, Zambia, Rhodesia, Botswana and Angola (Map 33); also in Madagascar and India. Widely scattered through the central and southern provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian, Madagascan and Deccan Regions.

¹ Hutchinson, J. (1960) The Families of Flowering Plants, ed. 2.

² Bullock, A. A. (1966) *Bistella* Adans. versus *Vahlia* Thunb. (Vahliaceae) in Acta Bot. Neerl. 15:84–85.

³ Bridson, D. M. (1975) A revision of the family Vahliaceae, in Kew Bull. 30:163–182.

Podostemaceae

45 **Tristicha trifaria** (Bory ex Willd.) Sprengel, Syst. Veg. 1:22 (1824); Baker in F.T.A. 6(1):121 (1909); Andr., F.P.S. 1:83 (1950); G. Taylor in F.W.T.A. ed. 2, 1:124, fig. 43 (1954).

Dufourea trifaria Bory ex Willd., Sp. Pl. 5:55 (1810).

Tristicha hyponoides (St.-Hil.) Sprengel, Syst. Veg. 4, Cur. Post. :10 (1827); Baker in F.T.A. 6(1):121 (1909); Broun & Massey, F.S. :70 (1929).

DARFUR Jebel Marra, massif, 1900 m; aquatic. *Wickens* 2994. DISTRIBUTION Widely distributed through tropical Africa (Map 34); widespread through the tropics of the Old and New World. In the Sudan it is found in the southern provinces.

FLORISTIC CATEGORY Pantropical.

Caryophyllaceae

46 **Arenaria leptoclados** (Reichenb.) Guss., Fl. Sic. Syn. 2:824 (1845); Andr., F.P.S. 1:86 (1950); Chater & Halliday in Fl. Europ. 1:121 (1964).

Arenaria serpyllifolia L. var. *leptoclados* Reichenb., Ic. Fl. Germ. 5:32 (1841).

DARFUR Jebel Marra, massif, 2000–2300 m; arable weed. *Dandy* 733 (BM!); *Kassas* 686 (KHU & CAI!).

DISTRIBUTION N. Africa, south and central Europe (Map 35), eastwards to Japan; introduced into N. America and Australia. Also known in the Sudan from the Red Sea Hills.

FLORISTIC CATEGORY Temperate weed of Mediterranean and Irano-Turanian Regions.

47 **Cerastium fontanum** Baumg., Enum. Stirp. Transs. 1:425 (1816); Davis, Fl. Turkey 2:80 (1967).

subsp. **triviale** (Link) Jalas in Arch. Soc. Zool.-Bot. Fenn.

'Vanamo' 18(1):63 (1963); Davis, Fl. Turk. 2:80 (1967).

[*Cerastium vulgatum* L., Sp. Pl. ed. 2, :267 (1762), non L. (1755) et sensu Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S. :70 (1929); Andr., F.P.S. 1:86 (1950).]

C. triviale Link, Enum. Hort. Berol. 1:433 (1821).

DARFUR Jebel Marra, massif, 2300–2600 m; damp grassland.

Lynes 84 (BM!); *Kassas* 654 (KHU & CAI!).

DISTRIBUTION Widespread through the temperate regions of the world (Map 36).

FLORISTIC CATEGORY Temperate weed.

48 **Cerastium octandrum** Hochst. ex A. Rich., Tent. Fl. Abyss. 1:45 (1847); Andr., F.P.S. 1:86 (1950); Cuf., Enum. :93 (1953); Keay, F.W.T.A. ed. 2, 1:129 (1954); Turrill, F.T.E.A. Caryoph. :21, fig. 9 (1956).

DARFUR Jebel Marra, massif, 2300–3070 m; moist sites. *Dandy* 737 (BM!); *Wickens* 1699, 2441 & 2685.

DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra, Red Sea Hills and the Imatongs), Ethiopia, Uganda, Kenya and Tanzania (Map 37).

FLORISTIC CATEGORY Afro-montane.

49 **Drymaria cordata** (L.) Willd. ex Roem. & Schultes, Syst. Veg. 5:406 (1819); Oliver, F.T.A. 1:143 (1868); Andr., F.P.S. 1:86, fig. 57 (1950); Cuf., Enum. :96 (1953); Keay, F.W.T.A. ed. 2, 1:131, fig. 46 (1954); Turrill, F.T.E.A. Caryoph. :9 fig. 4 (1956). *Holosteum cordatum* L., Sp. Pl. :88 (1753).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; river banks. *Wickens* 997 & 1198.

DISTRIBUTION From Guinée to Cameroon and eastwards to the Sudan Republic (Jebel Marra and the Imatongs) and Ethiopia and south through E. Africa to the Cape (Map 38); throughout the tropics.

FLORISTIC CATEGORY Pantropical.

50 **Minuartia filifolia** (Forsk.) Mattf. in Fedde Rep., Beih. 15:93 (1922); Andr., F.P.S. 1:86 (1950); Cuf., Enum. :94 (1953); Turrill, F.T.E.A. Caryoph. :17, fig. 8 (1956).
Arenaria filifolia Forsk., Fl. Aegypt.-Arab. :211 (1775).
Alsine schimperi Hochst. ex A. Rich., Tent. Fl. Abyss. 1:47 (1847); Norman in Journ. Bot. 62:136 (1924).
Arenaria schimperi (Hochst. ex A. Rich.) Oliver, F.T.A. 1:142 (1868); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :70 (1929).
 DARFUR Jebel Marra, massif, 2550–3070 m; upland meadow.
Lynes s.n., 54a & 54b (BM!). *Sandison* 8, 9 & 10 (all BM!); *Dandy* 88 & 112 (both BM!); *Jackson* 2652 & 3336; *Robertson* 128, *Wickens* 1675 & 2369.
 DISTRIBUTION Uplands of Sudan Republic (Jebel Marra), Ethiopia and Somali Republic with isolated occurrences in Kenya and Tanzania; also in Arabia (Map 39).
 FLORISTIC CATEGORY Afro-montane.

51 **Polycarpaea corymbosa** (L.) Lam., Ill. Gen. Encycl. 2:129 (1797); Oliver, F.T.A. 1:145 (1868), *pro parte*; Broun & Massey, F.S. :71 (1929); Andr., F.P.S. 1:87, fig. 58 (1950); Cuf., Enum. :97 (1953); Keay, F.W.T.A. ed. 2, 1:132 (1954); Turrill, F.T.E.A. Caryoph. :8 (1956); Quézel, Dossier 5:103 (1969).
Achyranthes corymbosa L., Sp. Pl. :205 (1753).
 DARFUR Lowland plain, 1030 m; rock crevices. *Wickens* 2353.
 Vernacular name: (Fur) *tamarri mari*.
 DISTRIBUTION Widespread throughout the tropics. Widespread throughout the Sudan.
 FLORISTIC CATEGORY Pantropical.

52 **Polycarpaea eriantha** Hochst. ex A. Rich., Tent. Fl. Abyss. 1:303 (1847); Broun & Massey, F.S. :71 (1929); Andr., F.P.S. 1:87 (1950); Cuf., Enum. :98 (1953); Keay, F.W.T.A. ed. 2, 1:132 (1954); Turrill, F.T.E.A. Caryoph. :7, fig. 3 (1956).
 var. **eriantha**; Turrill in Kew Bull. 1954:503 (1954) & F.T.E.A. Caryoph. :7 (1956).
 DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1030–1130 m; rock crevices. *Wickens* 2333, 2353a & 2568.
 DISTRIBUTION Widespread in tropical Africa. Widespread in the central provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

Silene The three species recorded from Jebel Marra may be identified according to the following key:

- 1 Glabrous perennial herb, sometimes with viscid internodes; inflorescence lax divaricate panicle or in reduced forms thereof; calyx 3.2–4.4 cm long. *S. macrosolen*
- 1 Pubescent herbs:
- 2 Eglandular, puberulous to shortly pubescent perennial herb; inflorescence in loose, apparently unilateral spicate racemes; calyx 1.1–2.5 (–3.5) cm long. *S. burchellii*
- 2 Glandular pubescent, usually a perennial but sometimes an annual herb; inflorescence a simple scorpioid cymose panicle; calyx 2.7–3.1 cm long. *S. lynesii*

53 **Silene burchellii** Othl ex DC., Prodr. 1:374 (1824); Oliver, F.T.A. 1:138 (1868); Cuf., Enum. :102 (1953); Turrill, F.T.E.A. Caryoph. :33, fig. 13 (1956).
Silene chirensis A. Rich., Tent. Fl. Abyss. 1:44 (1847); Andr., F.P.S. 1:90 (1950); Cuf., Enum., :102 (1953).
 DARFUR Jebel Marra massif, 2300 m; upland grassland and arable land. *Wickens* 1241 & 2658.
 DISTRIBUTION Uplands of the Sudan (Jebel Marra, Red Sea Hills and the Imatongs) and Ethiopia southwards through E. Africa to the Cape, also in Arabia (Map 40).
 FLORISTIC CATEGORY Afro-montane.
 Note: The taxonomy of this species has been discussed by Hedberg in Svensk Bot. Tidskrift 48:199–210 (1954) & Symb. Bot. Upsal. 15(1):270 (1957). He found he was unable to maintain the afro-alpine infraspecific taxa on the morphological evidence without further breeding experiments.

54 **Silene lynesii** Norman in Journ. Bot. 62:135 (1924); Andr., F.P.S. 1:90 (1950); Quézel, Dossier 5:103 (1969).
 [*Silene macrosolen* sensu Broun & Massey, F.S. :70 (1929) non Steud. ex A. Rich. (1847).]
Silene kilianii Maire in Bull. Soc. Hist. Nat. Afr. Nord. 20:173 (1929).
Silene hoggariensis Quézel in Bull. Soc. Hist. Nat. Afr. Nord 45:57, fig. 1B (1954).
 DARFUR Jebel Marra, massif, 1675–3070 m; upland grassland and arable land. *Lynes* 37a (BM!) & 105b (BM! holotype); *Sandison* 30 & 31 (both BM!); *Macintosh* 14 & 112; *Dandy* 92 (BM!); *Aglen* 6; *Jackson* 2608 & 2651; *Robertson* 143; *Pettet* 182; *Wickens* 1428, 1727, 1927, 2363, 2458 & 2588. Vernacular name: (Fur) *kumon*.
 DISTRIBUTION Ahaggar, Tassili-n-Ajjer, Tibesti and Jebel Marra and its northern outlier Jebel Gurgeil. (Map 41).
 FLORISTIC CATEGORY Saharo-montane.
 Note: Norman *l. c.* suggests *S. lynesii* allied to *S. macrosolen* Steud. ex A. Rich. and *S. villosa* Forsk.

55 **Silene macrosolen** Steud. ex A. Rich., Tent. Fl. Abyss. 1:44 (1847); Oliver, F.T.A. 1:139 (1868); Norman in Journ. Bot. 62:136 (1924); Andr., F.P.S. 1:89 (1950); Cuf., Enum. :1103 (1953); Turrill, F.T.E.A. Caryoph. :34 (1956); Quézel, Dossier 5:103 (1969).
 DARFUR Jebel Marra, massif, 2550 m; moist hill slopes. *Lynes* 106a (BM!) & 106b.
 DISTRIBUTION Sudan Republic (Jebel Marra and its northern outlier Jebel Gurgeil), Ethiopia, Kenya and Tanzania (Map 41).
 FLORISTIC CATEGORY Afro-montane.

Aizoaceae

56 **Glinus lotoïdes** L., Sp. Pl. :463 (1753); Broun & Massey, F.S. :73 (1929); Andr., F.P.S. 1:92 (1950); Cuf., Enum. :84 (1953); Keay, F.W.T.A. ed. 2, 1:135 (1954); Jeffrey, F.T.E.A. Aizoac. :15 fig. 5/1–7 (1961).
Mollugo glinus A. Rich., Tent. Fl. Abyss. 1:48 (1947); Oliver, F.T.A. 2:590 (1871).
 DARFUR Lowland plain, 1020 m; prostrate herb of shallow silty depressions. *Wickens* 1133 & 1343.
 DISTRIBUTION Throughout Africa and the tropics and sub-tropics generally; introduced into N. America. Widespread in moist shady places in central and northern Sudan.
 FLORISTIC CATEGORY Palaeotropical.

57 **Glinus lotoïdes** L. × **G. oppositifolius** (L.) A. DC.; Jeffrey, F.T.E.A. Aizoac. :17 (1961).
 DARFUR Lowland plain, 1020 m; prostrate herb of shallow clay depressions. *Wickens* 1781.

58 **Zaleya pentandra** (L.) Jeffrey in Kew Bull. 14:238 (1960); Jeffrey, F.T.E.A. Aizoac. :28, fig. 9 (1961); Wickens, For. Bull. 14(N.S.) :5 (1969); Quézel, Dossier 5:104 (1969).
Trianthema pentandra L., Mant. 1:70 (1767); Oliver, F.T.A. 2:588 (1871); Broun & Massey, F.S. :74 (1929); Andr., F.P.S. 1:96, fig. 61 (1950); Keay, F.W.T.A. ed. 2, 1:136 (1954).
 DARFUR Jebel Marra, massif, 1900 m; *Kassas* 733 (KHU & CAI!).
 DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; also in Egypt, Arabia, Palestine and Madagascar. Widely distributed through the central provinces of the Sudan.
 FLORISTIC CATEGORY Palaeotropical; weed of cultivation.

Portulacaceae

59 **Portulaca oleracea** L., Sp. Pl. :445 (1753); Oliver, F.T.A. 1:148 (1868); Broun & Massey, F.S. :75 (1929); Andr., F.P.S. 1:97 (1950); Cuf., Enum. :91 (1953); Keay, F.W.T.A. ed. 2, 1:137 (1954); Quézel, Dossier 5:104 (1969).
DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; arable weed. *Wickens* 1051, 1153 & 1397. Vernacular name: (Fur) *oong dali*; (Arabic) *rigla*. Plant used as a vegetable.
DISTRIBUTION Widespread in the tropics and subtropics, also into the warm temperate. Widespread in the Sudan.
FLORISTIC CATEGORY Subcosmopolitan.

Polygonaceae

60 **Oxygonum sinuatum** (Meisn.) Dammer in Engl., Pflanzenw. Ost-Afr. C:170 (1895); Graham, F.T.E.A. Polygon. :34 (1958); Wickens, For. Bull. 14(N.S.) :5 (1969).
Ceratogonum sinuatum Meisn. in DC., Prodr. 14:40 (1856).
Ceratogonum cordofanum Meisn. in DC., Prodr. 14:39 (1856).
Oxygonum atriplicifolium (Meisn.) Mart. var. *sinatum* (Meisn.) Baker & Wright in F.T.A. 6(1):101 (1909); Broun & Massey, F.S. :76 (1929); Andr., F.P.S. 1:101 (1950); Cuf., Enum. :44 (1953); Quézel, Dossier 5:104 (1969).
DARFUR Jebel Marra, massif, 1780 m; lowland plain, 1020–1100 m; arable weed. *Lynes* 598; *Wickens* 1954, 1971 & 2700. Vernacular name: (Arabic) *shok*.
DISTRIBUTION Northern and central provinces of the Sudan Republic and Ethiopia (*vide* Cufodontis) southwards through E. Africa to Angola, Transvaal and Natal; also in Arabia.
FLORISTIC CATEGORY Sudano-Zambezian Region.

61 **Polygonum aviculare** L., Sp. Pl. :362 (1753); Baker & Wright in F.T.A. 6(1):105 (1909); Graham, F.T.E.A. Polygon. :14 fig. 3/8 (1958).
DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1142.
DISTRIBUTION A native of temperate Europe, now widely distributed throughout the world. Sole record for the Sudan seen at Kew.
FLORISTIC CATEGORY Cosmopolitan weed.

62 **Polygonum nepalense** Meisn., Monogr. Polygon. :84 (1826); Keay, F.W.T.A. ed. 2, 1:140 (1954); Graham, F.T.E.A. Polygon. :12, fig. 3/2 (1958).
Polygonum alatum Buch.-Ham. ex Sprengel, Syst. Veg., cur. post. :154 (1827); Baker & Wright in F.T.A. 6(1):104 (1909).
DARFUR Jebel Marra, massif, 2300 m; arable weed. *Wickens* 2442 & 2461.
DISTRIBUTION Throughout east tropical Africa, possibly introduced into southern Africa; also in Madagascar and tropical Asia. Also occurs in the Sudan in Red Sea Hills.
FLORISTIC CATEGORY Palaeotropical weed.

63 **Polygonum plebeium** R.Br., Prodr. :420 (1810); Baker & Wright in F.T.A. 6(1):105 (1909); Broun & Massey, F.S. :76 (1929); Andr., F.P.S. 1:102 (1950); Cuf., Enum. :42 (1953); Keay, F.W.T.A. ed. 2, 1:140 (1954); Graham, F.T.E.A. Polygon. :13, fig. 3/6–7 (1958).
DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1141, 1751 & 1791.
DISTRIBUTION Senegal to Northern Nigeria eastwards to the Somali Republic and south through E. Africa into southern Africa; also in Egypt, Palaestine, Madagascar, Afghanistan, India, Philippines and Australia. Northern and central Sudan *vide* F. W. Andrews, but the only records seen, other than for Darfur, are from Khartoum.
FLORISTIC CATEGORY Palaeotropical weed.

64 **Polygonum salicifolium** Willd., Enum. Hort. Berol. :428 (1809); Andr., F.P.S. 1:102 (1950); Cuf., Enum. :43 (1953); Keay, F.W.T.A. ed. 2, 1:141 (1954); Graham, F.T.E.A. Polygon. :17, fig. 3/1 (1958).
Polygonum serrulatum Lag., Gen. & Sp. Pl. Nov. :14 (1816); Baker & Wright in F.T.A. 6(1):107 (1909); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :76 (1929).
DARFUR Jebel Marra, piedmont and massif, 1160–2500 m; lowland plain, 1020 m; aquatic herb. *Lynes* s.n. (BM!); *Macintosh* 32; *Steele* 31 & 32; *Dandy* 168 (BM!); *Jackson* 3302; *Robertson* 118; *Wickens* 1001 & 1364.
DISTRIBUTION Widespread throughout the tropics. Occurs in the southern provinces of the Sudan.
FLORISTIC CATEGORY Pantropical.

65 **Polygonum setulosum** A. Rich., Tent. Fl. Abyss. 2:227 (1851); Graham, F.T.E.A. Polygon. :22, fig. 4/1–2 (1958).
[*Polygonum accuminatum* sensu Baker & Wright in F.T.A. 6(1) :112 (1909); Broun & Massey, F.S. :77 (1929); Andr., F.P.S. 1:103 (1950), *non* Kunth (1817).]
[*Polygonum barbatum* sensu Baker & Wright in F.T.A. 6(1):109 (1909), *pro parte*; Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :76 (1929); Andr., F.P.S. 1:103 (1950), *non* L. (1753).]
[*Polygonum glabrum* sensu Broun & Massey, F.S. :77 (1929); Andr., F.P.S. 1:103 (1950); *non* Willd. (1799).]
[*Polygonum senegalensis* sensu Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :77 (1929); Andr., F.P.S. 1:103 (1950), *non* Meisn. (1826).]
DARFUR Jebel Marra, piedmont and massif, 1160–2200 m; lowland plain, 1100 m; stream banks. *Lynes* 29 (BM!), 96 (BM!) & 513; *Wickens* 1199 & 2224.
DISTRIBUTION Widely distributed in tropical and sub-tropical Africa; range not fully known. Widespread in the southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region, possibly wider.

66 **Rumex abyssinicus** Jacq., Hort. Vindob. 3:48, t.93 (1776); Baker & Wright in F.T.A. 6(1):114 (1909); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :77 (1929); Andr., F.P.S. 1:104 (1950); Cuf., Enum. :38 (1953); Rech.f. in Bot. Not. Suppl. 3(3):29 (1954); Graham, F.T.E.A. Polygon. :7, fig. 2/3–6 (1958).
Rumex schimperii Meisn. in DC., Prodr. 14:67 (1856).
DARFUR Jebel Marra, massif, 1780–2500 m; weed of stream banks and arable lands. *Lynes* 64 & 157 (BM!); *Steele* 28; *Wickens* 2707.
DISTRIBUTION Nigeria and Cameroon across to Ethiopia and south through E. Africa to Rhodesia and the Transvaal; also in Madagascar. Also occurs in the Sudan in the Imatongs.
FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

67 **Rumex bequaertii** De Wild., Pl. Bequaert. 5:2 (1929); Andr., F.P.S. 1:105 (1950); Cuf., Enum. :39 (1953); Keay, F.W.T.A. ed. 2, 1:139 (1954); Rech.f. in Bot. Not. Suppl. 3(3):93 (1954); Graham, F.T.E.A. Polygon. :8 (1958).
[*Rumex nepalensis* sensu Baker & Wright in F.T.A. 6(1):117 (1909); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :78 (1929); Andr., F.P.S. 1:105 (1950), *non* Spreng. (1825).]
DARFUR Jebel Marra, massif, 1980–2450 m; weed of irrigated lands. *Lynes* 63 & 158 (BM!); *Wickens* 1236, 1440, 1729 & 2445. Vernacular name: (Fur) *dirrign* or *muradi*.
DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra, the Imatongs and Didinga Hills) and Ethiopia south through E. Africa to Rhodesia, and the Transvaal; also on Cameroon Mtn. and in Madagascar. (Map 42).
FLORISTIC CATEGORY Afro-montane and Madagascan Regions.

Illecebraceae

68 **Cometes abyssinica** *R.Br.* in Wall., *Pl. Asiat. Rar.* 1:18, t.18 (1829); Baker & Wright in *F.T.A.* 6(1):14 (1913); Norman in *Journ. Bot.* 62:136 (1924); Broun & Massey, *F.S.* :78 (1929); Andr., *F.P.S.* 1:105, fig. 67 (1950); Cuf., *Enum.* :101 (1953); Quézel, *Dossier* 5:103 (1969).

DARFUR Jebel Marra, massif, 1770–2130 m; weed of arable lands and upland grassland. *Lynes* 10b & 10c (BM!); *Jackson* 3313; *Robertson* 122; *Wickens* 1481 & 2637. Vernacular name: (Fur) *daro* or *korangal*.

DISTRIBUTION Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia, Somali Republic, Egypt and Arabia; introduced in the Comoro Is. (Map 43).

FLORISTIC CATEGORY Ethiopian Montane.

Note: A small genus of only two species, which may be separated according to the following key:

Stem scabrid. Leaves sessile, less than 5 mm wide, pubescent.

Stamens shorter than the staminodes. *C. abyssinica*.

Stem pubescent. Leaves petiolate, 10 mm wide, glabrous.

Stamens longer than the staminodes. *C. surattensis*.

The second species, *C. surattensis* L. is distributed between north-west India and Arabia, extending to the Sinai peninsula. The distribution patterns of the two species suggests that the westward migration of *C. surattensis* had been prevented by the faulting of the Red Sea and that *C. abyssinica* was already established in both Arabia and Ethiopia prior to the fault.

Chenopodiaceae

69 **Chenopodium murale** *L.*, *Sp. Pl.* :219 (1753); Baker & C. B. Clarke in *F.T.A.* 6(1):78 (1909); Norman in *Journ. Bot.* 62:135 (1924); Broun & Massey, *F.S.* :79 (1929); Andr., *F.P.S.* 1:109 (1950); Cuf., *Enum.* :46 (1953); Brenan, *F.T.E.A.* *Chenopod.* :7, fig. 2/3 (1954) & in *F.W.T.A.* ed. 2, 1:144 (1954); *Wickens*, *For. Bull.* 14(N.S.) :5 (1969).

forma **albescens** (*Mog.*) *Hegi*, *Ill. Fl. Mittel-Eur.* 3:224 (1910).

Chenopodium murale *L.* var. *albescens* *Moq.*, *Chenopod. Monogr.*

Enum. :32 (1840). [*Chenopodium album* sensu Broun & Massey, *F.S.* :79 (1929), *non* *L.* (1753).]

DARFUR Jebel Marra, massif, 1900–2300 m; lowland plain, 1020 m; arable weed. *Lynes* 156; *Wickens* 1162, 1710 & 2980. Vernacular name: (Fur) *fanneh barr* or *kugnu*.

DISTRIBUTION Widespread in tropical Africa from Senegal across to the Somali Republic and south to the Cape, and in N. Africa; widespread throughout the world. Widely distributed in the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Cosmopolitan weed.

70 **Chenopodium opulifolium** *Schrad. ex Koch & Ziz*, *Cat.*

Pl. Palat. :6 (1814); Baker & C. B. Clarke in *F.T.A.* 6(1):78 (1909); Brenan, *F.T.E.A.* *Chenopod.* :6, fig. 2/2 (1954).

Chenopodium mucronatum *Thumb.* var. *subintegrum* *Aellen* in *Fedde Rep.* 24:340 (1928); Andr., *F.P.S.* 109 (1950).

DARFUR Jebel Marra, massif, 1780 m; *Kassas* 896 (KHU & CAI!) DISTRIBUTION Southern provinces of the Sudan Republic, Ethiopia and Somali Republic southwards to Rhodesia and Angola; also Europe and the Mediterranean Region eastwards to India and Mongolia; adventive in N. America.

FLORISTIC CATEGORY Subcosmopolitan weed.

71 **Chenopodium schraderanum** *Schultes*, *Syst. Veg.* 6:260 (1820); Baker & C. B. Clarke in *F.T.A.* 6(1):80 (1909); Broun & Massey, *F.S.* :79 (1929); Andr., *F.P.S.* 1:109 (1950); Cuf., *Enum.* :47 (1953); Brenan, *F.T.E.A.* *Chenopod.* :12, fig. 2/7 (1954); Quézel, *Dossier* 5:105 (1969).

Chenopodium foetidum *Schrad.* in *Magaz. Ges. Naturf. Freunde Berlin* 2:79 (1808); Norman in *Journ. Bot.* 62:135 (1924), *non* *Lam.* (1778).

DARFUR Jebel Marra, massif, 1980–2300 m; arable weed. *Lynes* 37d & 65 (BM!); *Dandy* 133 (BM!); *Wickens* 2456.

DISTRIBUTION From the Sudan Republic (Jebel Marra and the Imatongs) and Ethiopia south through E. Africa to the Cape and Angola; rarely adventive in Europe and Asia Minor.

FLORISTIC CATEGORY Afriental and Zambeziian Domains.

Amaranthaceae

In the Amaranthaceae, certainly as far as the African species are concerned, the plants are essentially weeds of cultivation and waste places. The African species have been revised by A. Cavaco, 'Les *Amaranthaceae* de l'Afrique au sud du tropique de Cancer et de Madagascar', *Mém. Mus. Nat. Hist. Nat. Sér. B, Bot.* 13, fasc. 1, 1–254 (1962).

72 **Achyranthes aquatica** *R.Br.*, *Prodr. Fl. Nov. Holl.* 1:417 (1810); Baker & C. B. Clarke in *F.T.A.* 6(1):64 (1909); Broun & Massey *F. S.* :85 (1929); *Wickens*, *For. Bull.* 14(N.S.) :5 (1969). *Centrostachys aquatica* (*R.Br.*) *Wall.* in *Roxb., Fl. Ind.* 2:497, 579 (1824); Andr., *F.P.S.* 1:118 (1950); Cuf., *Enum.* :74 (1953); Keay, *F.W.T.A.* ed. 2, 1:153 (1954).

DARFUR Lowland plain, 1020 m; herb of marshy ground. *Wickens* 1362.

DISTRIBUTION Senegal, Nigeria, Sudan Republic, Ethiopia, Uganda, Tanzania, Zambia and Rhodesia. Frequent in central and southern Sudan; also in Asia.

FLORISTIC CATEGORY Palaeotropical.

73 **Achyranthes aspera** *L.*, *Sp. Pl.* :204 (1753); Baker & C. B. Clarke in *F.T.A.* 6(1):63 (1909); Norman in *Journ. Bot.* 62:135 (1924); Broun & Massey, *F.S.* :84 (1929); Andr., *F.P.S.* 1:113, fig. 70 (1950); Cuf., *Enum.* :72 (1953); Keay, *F.W.T.A.* ed. 2, 1:152, fig. 54 (1954); Quézel, *Dossier* 5:105 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2800 m; lowland plain, 1020 m; weed of stream banks and arable lands, *Lynes* 62, 62a, 62b, 62c (BM!) & 594; *Macintosh* 3; *Dandy* 128 (BM!); *Pellet* s.n.; *Wickens* 1091, 1239, 1271 & 2425.

DISTRIBUTION Throughout Africa from the north to the Cape; widespread through the Old World, introduced into S. America, adventive in Europe. Widespread in the Sudan.

FLORISTIC CATEGORY Panropical weed.

74 **Aerva javanica** (*Burm.f.*) *Juss. ex Schultes*, *Syst. Veg.* 5:565 (1819); Andr., *F.P.S.* 1:113 (1950); Keay, *F.W.T.A.* ed. 2, 1:149 (1954); Quézel, *Dossier* 5:105 (1969).

Iresine javanica *Burm.f.*, *Fl. Ind.* :212 (sphalm.) 312, t.65, fig. 1 (1768).

Aerva tomentosa *Forsk.*, *Fl. Aegypt.-Arab.* cxxii & 170 (1775); Baker & C. B. Clarke in *F.T.A.* 6(1):37 (1909); Broun & Massey, *F.S.* :83 (1929).

Aerva persica (*Burm.f.*) *Merrill* in *Philipp. Journ. Sci.* 19:348 (1921); Cuf., *Enum.* :69 (1953).

DARFUR Lowland plain, 1100 m; *Lynes* 50a.

DISTRIBUTION From Morocco to N. Nigeria eastwards across Arabia to India; also in Madagascar (Map 44). Widespread in northern and central Sudan.

FLORISTIC CATEGORY Saharo-Sindian Region and Sahelian Domain.

75 **Alternanthera nodiflora** *R.Br.*, *Prodr. Fl. Nov. Holl.* 1:417 (1810); Baker & C. B. Clarke in *F.T.A.* 6(1):73 (1909); Broun & Massey, *F.S.* :85 (1929); Andr., *F.P.S.* 1:115, fig. 7 (1950); Cuf., *Enum.* :74 (1953); Keay, *F.W.T.A.* ed. 2, 1:154, fig. 56 (1954); Quézel, *Dossier* 5:105 (1969).

DARFUR Lowland plain, 730–1100 m; alluvial soil. *Lynes* 595; *Wickens* 1131 & 2019.

DISTRIBUTION Gambia to Cameroon and eastwards to the central and northern provinces of the Sudan Republic and south through Kenya and Tanzania to Angola and SW. Africa; also in SW. Asia and Australia.

FLORISTIC CATEGORY Palaeotropical weed.

76 ***Alternanthera sessilis* (L.) Sweet**, Hort. Suburb. Lond. :48 (1818); Andr., F.P.S. 1:115 (1950); Cuf., Enum. :75 (1953); Keay, F.W.T.A. ed. 2, 1:154 (1954) & Amdt., 1:760 (1958). *Gomphrena sessilis* L., Sp. Pl. :225 (1753). *Alternanthera achyranthoides* Forsk., Fl. Aegypt.-Arab. :lix & 28 (1775); Baker & C. B. Clarke in F.T.A. 6(1):73 (1909); Broun & Massey, F.S. :85 (1929). DARFUR Jebel Marra, piedmont, 1160 m; arable weed. *Wickens* 1660. DISTRIBUTION Throughout tropical and southern Africa; widespread in the warmer parts of the world. Widespread through the Sudan. FLORISTIC CATEGORY Pantropical weed.

77 ***Amaranthus hybridus* L., Sp. Pl. :990 (1753).** subsp. **hybridus**. DARFUR Jebel Marra, piedmont, 1160 m; arable weed. *Wickens* 2254. DISTRIBUTION Widespread in tropical Africa, a cosmopolitan weed, possibly native of the New World (*vide* Brenan in Watsonia 4:268 (1961)). Widely distributed through the central provinces of the Sudan. FLORISTIC CATEGORY Cosmopolitan weed.

78 subsp. ***incurvatus* (Timeroy ex Gren. & Godr.) Brenan** in Watsonia 4:268 (1961). *Amaranthus incurvatus* Timeroy ex Gren. & Godr., Prosp. Fl. Fr. :8 (1846). *Amaranthus hybridus* L. subsp. *cruentus* (L.) Thell. in Mém. Soc. Nat. Sci. Nat. Math. Cherbourg 38:205 (1912); Keay, F.W.T.A. ed. 2, 1:148 (1954); Wickens, For. Bull. 14(N.S.) :5 (1969). [*Amaranthus caudatus* sensu Baker & C. B. Clarke in F.T.A. 6(1):31 (1909), pro parte; Broun & Massey, F.S. :82 (1929); Andr., F.P.S. 1:116 (1950), *non* L. (1753).] DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1020–1100 m; arable weed. *Lynes* 596; *Wickens* 1740, 1787 & 1879. DISTRIBUTION Widespread in tropical Africa and the tropics generally; a native of S. America. Widely distributed through the central and southern provinces of the Sudan. FLORISTIC CATEGORY Pantropical weed.

79 ***Amaranthus spinosus* L., Sp. Pl. :991 (1753); Baker & C. B. Clarke in F.T.A. 6(1):32 (1909); Andr., F.P.S. 1:116 (1950); Cuf., Enum. :60 (1953); Keay, F.W.T.A. ed. 2, 1:148 (1954).** DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1140. DISTRIBUTION Widespread in tropical and southern Africa and in the Old World tropics generally. Also recorded in the Sudan from the Blue Nile Province. FLORISTIC CATEGORY Palaeotropical weed.

80 ***Amaranthus viridis* L., Sp. Pl. ed. 2, :1405 (1763); Baker & C. B. Clarke in F.T.A. 6(1):33 (1909); Andr., F.P.S. 1:117 (1950); Keay, F.W.T.A. ed. 2, 1:148 (1954).** *Amaranthus oleraceus* L. pro parte sensu Baker & C. B. Clarke in F.T.A. 6(1):34 (1909); Broun & Massey, F.S. :82 (1929). DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1020 m; arable weed. *Wickens* 1097 & 1792. DISTRIBUTION Widespread in tropical and southern Africa and in the Old World tropics generally. Also recorded in the Sudan from the Blue Nile Province. FLORISTIC CATEGORY Palaeotropical weed.

81 ***Celosia argentea* L., Sp. Pl. :205 (1753); Baker & C. B. Clarke in F.T.A. 6(1):17 (1909); Broun & Massey, F.S. :81 (1929); Andr., F.P.S. 1:117, fig. 2 (1950); Cuf., Enum. :55 (1953); Keay, F.W.T.A. ed. 2, 1:146, fig. 52 (1954); Quézel, Dossier 5:105 (1969).** DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1110. DISTRIBUTION Widespread in tropical Africa and the Old World tropics generally. Widespread in the central and southern provinces of the Sudan. FLORISTIC CATEGORY Palaeotropical weed.

82 ***Celosia trigyna* L., Mant. :212 (1771); Baker & C. B. Clarke in F.T.A. 6(1):19 (1909); Broun & Massey, F.S. :81 (1929); Andr., F.P.S. 1:117 (1950); Cuf., Enum. :56 (1953); Keay, F.W.T.A. ed. 2, 1:146 (1954).** DARFUR Jebel Marra, piedmont and massif, 1160–2050 m; lowland plain, 1020 m; arable weed. *Lynes* 597 (BM!); *Macintosh* 20 & 31; *Dandy* 37 & 146 (both BM!); *Wickens* 1048, 1149, 1410 & 2534. Vernacular name: (Fur) *kuno*. DISTRIBUTION Widespread in tropical and southern Africa; also in S. Arabia and Madagascar. Widely distributed throughout the Sudan. FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

83 ***Nothosaerva brachiata* (L.) Wight**, Icon. 6:1 (1853); Andr., F.P.S. 1:119 (1950); Cuf., Enum. :70 (1953); Keay, F.W.T.A. ed. 2, 1:149 (1954). *Achyranthes brachiata* L., Mant. :50 (1767). *Aerva brachiata* (L.) Mart. in Nova Acta Nat. Cur. 13:291 (1826); Baker & C. B. Clarke in F.T.A. 6(1):40 (1909); Broun & Massey, F.S. :83 (1929). DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1151. DISTRIBUTION Nigeria across to the Somali Republic and south through E. Africa to Rhodesia and Angola; also the Mascarene Is. and India. Widely scattered in the central provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

84 ***Pandiaka angustifolia* (Vahl) Hepper** in Kew Bull. 25:189 (1971). *Gomphrena angustifolia* Vahl, Symb. Bot. 3:45 (1794); Schumacher, Beskr. Guin. Pl. :157 (1827) & in Kon. Danske Vidensk. Selskabs Natur. Math. IV, 3:177 (1828); Junghans in Bot. Tidssk. 57:321 (1961). *Achyranthes heudelotii* Moq. in DC., Prodr. 13(2):310 (1828). *Achyranthes angustifolia* Benth. in Hook., Niger Fl. :492 (1849). *Pandiaka heudelotii* (Moq.) Hook.f. in Benth. & Hook.f., Gen. Pl. 3:36 (1880); Baker & C. B. Clarke in F.T.A. 6(1):65 (1909); Broun & Massey, F.S. :85 (1929); Andr., F.P.S. 1:120 (1950); Keay, F.W.T.A. ed. 2, 1:151 (1954); Quézel, Dossier 5:105 (1969). DARFUR Lowland plain, 1020 m; savanna. *Wickens* 2089 & 2344. DISTRIBUTION Senegal to Cameroon eastwards to the Sudan and Uganda. Found throughout the central and southern provinces of the Sudan. FLORISTIC CATEGORY Sudanian Domain. Note: Although the type is said to have come from India, the genus is not otherwise recorded there. It is believed to have originated from Africa (Hepper *l. c.*).

85 ***Pupalia lappacea* (L.) Juss.** in Ann. Mus. Paris 2:132 (1803); Baker & C. B. Clarke in F.T.A. 6(1):47 (1909); Broun & Massey, F.S. :84 (1929); Andr., F.P.S. 1:122, fig. 73 (1950); Keay, F.W.T.A. ed. 2, 1:151, fig. 53 (1954); Quézel, Dossier 5:105 (1969). *Achyranthes lappacea* L., Sp. Pl. 204 (1753). DARFUR Jebel Marra, massif, 1340–1780 m; *Kassas* 197 & 850 (both KHU & CAI!). DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in Madagascar and extending through Egypt and Arabia to New Guinea. Widespread through the central and southern provinces of the Sudan. FLORISTIC CATEGORY Palaeotropical weed.

Linaceae

86 **Linum strictum** L., Sp. Pl. :279 (1753); Oliver, F.T.A. 1:269 (1868); Broun & Massey, F.S. :86 (1929); Andr., F.P.S. 1:123 (1950); Cuf., Enum. :354 (1956); Quézel, Dossier 5:106 (1969). subsp. **corymbulosum** (Reichenb.) Rouy, Fl. Fr. 4:60 (1897). *Linum corymbulosum* Reichenb., Fl. Germ. Excurs. :834 (1832). DARFUR Jebel Marra, massif, 2100–2400 m; upland meadow. *Macintosh* 51; *Jackson* 2607 & 3360. DISTRIBUTION Sudan Republic (Jebel Marra and north-eastern Sudan) and Ethiopia, N. Africa and southern Europe (Map 45) across to W. Pakistan. FLORISTIC CATEGORY Mediterranean and Irano-Turanian Regions.

Balanitaceae

87 **Balanites aegyptiaca** (L.) Del. in Descr. Égypt. Hist. Nat. 2:221, t.28, fig. 1 (1813); Oliver, F.T.A. 1:315 (1868); Broun & Massey, F.S. :228 (1929); Andr., F.P.S. 2:381, fig. 115 (1952); Cuf., Enum. :365 (1956); Keay, F.W.T.A. ed. 2, 1:364 (1958); Sahni, Trees N. Sudan :84, fig. 36 (1968); Quézel, Dossier 5:119 (1969). *Ximenia aegyptiaca* L., Sp. Pl. :1194 (1753). DARFUR Lowland plain, 760–945 (–1100) m; savanna. *Wickens* 1603 & 2907. *Wickens* 2907 is unusual, being an unarmed tree with longer than normal petioles, (1.5 cm), long pedicels (10 mm) and long, glabrous petals (8 mm). No other members of the large community where this specimen was found appeared to differ from the norm. Widely distributed throughout the Darfur lowlands, often replacing *Acacia albida* on the drier upper terrace soils of the major wadis, or co-dominant with *Acacia seyal* on the clays. Usually behaves as an evergreen tree but can be deciduous or partially deciduous in low rainfall areas; flowering in December and again in April and May in our area. Vernacular name: (Fur) *daay* or *daayngu*, pl. *keingu*; (Arabic) *heglig*. Wood used for writing slates and throwing sticks. The frayed twigs are used for toothbrushes. In times of famine the leaves are boiled to remove the bitter taste and eaten as a vegetable. The young shoots are used as seasoning, or chewed into a paste for dressing wounds. A cooking oil can be extracted from the crushed fruits. The powdered fruit and roots are used as a soap. DISTRIBUTION Widespread in the drier parts of tropical Africa, extending from Mauritania and the central Sahara across to Palestine, Arabia and India, and southwards through E. Africa to Rhodesia and Angola. Throughout the northern and central provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

Geraniaceae

88 **Erodium malacoides** (L.) L'Hérit. in Aiton, Hort. Kew. 2:415 (1789); Oliver, F.T.A. 1:292 (1868); Broun & Massey, F.S. :88 (1929); Andr., F.P.S. 1:128 (1950). *Geranium malacoides* L., Sp. Pl. :680 (1753). [*Erodium glaucophyllum* sensu Norman in Journ. Bot. 62:137 (1924), non Aiton (1789).] DARFUR Jebel Marra, massif, 2200–2750 m; upland grassland. *Lynes* 86 (BM!); *Steele* 16; *Sandison* 14 (BM!); *Aglen* 26; *Jackson* 2606 & 3363; *Robertson* 137; *Wickens* 1227, 1248, 1691, 1696 & 2370. DISTRIBUTION Sudan Republic (Jebel Marra & Red Sea Hills). N. Africa and Southern Europe (Map 46) across to the W. Himalayas. FLORISTIC CATEGORY Mediterranean and Irano-Turanian Regions.

89 **Geranium ocellatum** Jacquem. ex Cambess., Voy. Bot. 4:33 t.38 (1835); Milne-Redh. in F.W.T.A. ed. 2, 1:157 (1954); Cuf., Enum. :346 (1956); Kokwaro, F.T.E.A. Geraniac. :5 (1971) & in Webbia 25:643 (1971). [*G. favosum* sensu Broun & Massey, F.S. :88 (1929); Andr., F.P.S. 1:129 (1950) non Hochst. ex A. Rich. (1847).] DARFUR Jebel Marra, massif, 1765–2750 m; arable weed. *Steele* s.n.; *Dandy* 131 (BM!); *Wickens* 1211, 1682, 1928 & 2392. The plants of *Miss Steele* s.n. & *Wickens* 1928 have more strongly ridged fruits than the remainder of the specimens cited. Vernacular name: (Fur) *kushi* or *ngarta*. DISTRIBUTION Cameroon Mtn. and the uplands of the Sudan (Jebel Marra and the Red Sea Hills), Ethiopia and Somali Republic, Uganda, Kenya, Tanzania, Malawi, Zambia and Rhodesia (Map 47); also in the Yemen, Iran and the Himalayas across to Yunnan. FLORISTIC CATEGORY Afro-montane and Himalayan Regions.

90 **Monsonia senegalensis** Guill. & Perr., Fl. Seneg. 1:131 (1832); Oliver, F.T.A. 1:290 (1868); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :88 (1929); Andr., F.P.S. 1:131 (1950); Keay, F.W.T.A. ed. 2, 1:157 (1954); Cuf., Enum. :349 (1956); Quézel, Dossier 5:106 (1969); Kokwaro, F.T.E.A. Geraniac. :10, fig. 2 (1971) & in Webbia 25:651 (1971). DARFUR Jebel Marra, piedmont and foothills, 1160–1600 m; lowland plain, 1100 m; savanna. *Lynes* 108 (BM!) & 518; *Wickens* 2551. DISTRIBUTION Senegal, Niger Republic and N. Nigeria eastwards to Ethiopia, south through Kenya and Tanzania to Rhodesia, Angola and SW. Africa; also in Madagascar, Egypt, Arabia and India. Widespread through the central provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

Oxalidaceae

91 **Biophytum abyssinicum** Steud. ex A. Rich., Tent. Fl. Abyss. 1:122 (1847); Keay, F.W.T.A. ed. 2, 1:159 (1954); Cuf., Enum. 353 (1956); Kabuye, F.T.E.A. Oxalid. :12, fig. 2/A (1971). *Oxalis abyssinica* (Steud. ex A. Rich.) Walp., Ann. Bot. 2:241 (1852); Oliver, F.T.A. 1:297 (1868). DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; savanna and arable lands. *Wickens* 2116, 2276 & 2334. DISTRIBUTION N. Nigeria, Sudan Republic (Jebel Marra), Ethiopia, E. Africa, Malawi and Angola. FLORISTIC CATEGORY Sudano-Zambezian Region.

92 **Biophytum petersianum** Klotzsch in Peters, Naturwiss. Reise Mossamb. Bot. :81, t.15 (1861); Andr., F.P.S. 1:133, fig. 80 (1950); Keay, F.W.T.A. ed. 2, 1:159, fig. 59 (1954); Kabuye, F.T.E.A. Oxalid. :16, fig. 2/B (1971). *B. apodiscias* (Turcz.) Edgew. & Hook.f. in Fl. Brit. Ind. 1:437 (1874); Broun & Massey, F.S. :88 (1929). [*Oxalis sensitiva* sensu Oliver, F.T.A. 1:297 (1868), pro parte, non L. (1753).] DARFUR Jebel Marra, piedmont, 1160 m; arable lands. *Wickens* 2227. DISTRIBUTION Widespread in tropical and subtropical Africa; also in Asia and New Guinea. Also occurs in the southern provinces of the Sudan. FLORISTIC CATEGORY Palaeotropical weed.

93 ***Oxalis corniculata* L.**, Sp. Pl. :435 (1753); Oliver, F.T.A. 1:296 (1868), pro parte; Broun & Massey, F.S. :88 (1929), pro parte; Andr., F.P.S. 1:133, fig. 81 (1950), pro parte; Cuf., Enum. :352 (1956); Quézel, Dossier 5:106 (1969); Kabuye, F.T.E.A. Oxalid. :3, fig. 1/5 (1971).

DARFUR Jebel Marra, piedmont and massif, 1160–1300 m; marsh and irrigated lands. *Wickens* 1013, 1945 & 2859. Vernacular name: (Fur) *darra*.

DISTRIBUTION Widespread in the tropics and warm temperate areas of the world. Also occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Subcosmopolitan weed.

94 ***Oxalis latifolia* Kunth** in Humb., Bonpl. & Kunth, Nov. Gen. Sp. 5:237, t.467 (1822); Kabuye, F.T.E.A. Oxalid. :10 (1971).

DARFUR Jebel Marra, massif, 1780 m; weed of irrigated lands. *Wickens* 1482. Sole record for the Sudan.

DISTRIBUTION A native of tropical S. America, naturalized as a weed of cultivation in many parts of the world.

FLORISTIC CATEGORY Pantropical weed.

95 ***Oxalis radicata* A. Rich.**, Tent. Fl. Abyss. 1:123 (1847); Kabuye, F.T.E.A. Oxalid. :5, fig. 1/6 (1971).

[*O. corniculata* sensu Oliver, F.T.A. 1:297 (1968), pro parte; Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :88 (1929), pro parte; Andr., F.P.S. 1:133 (1950), pro parte, *non* L. (1753).]

DARFUR Jebel Marra, massif, 1750–2450 m; upland grassland. *Macintosh* 5 & 98; *Steele* 18; *Aglen* 59; *Robertson* 150; *Wickens* 1455, 1486, 2422 & 2880.

DISTRIBUTION Nigeria eastwards to the Somali Republic and south through E. Africa to Mozambique and Zambia. Also occurs in the Red Sea Hills and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Lythraceae

96 ***Ammania auriculata* Willd.**, Hort. Berol. 1:7, t.7 (1816); Keay, F.W.T.A. ed. 2, 1:164, fig. 61 (1954); Cuf., Enum. :606 (1959).

[*A. senegalensis* sensu Hiern in F.T.A. 2:477 (1871); Broun & Massey, F.S. :90 (1929); Andr., F.P.S. 1:138, fig. 84 (1950), pro parte, *non* Lam. (1792).]

DARFUR Jebel Marra, piedmont, 1160–1200 m; lowland plains, 1020 m; stream banks and irrigated lands. *Wickens* 992, 1137, 2044 & 2733; *Kamil* 1166.

DISTRIBUTION From Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to Mozambique and Rhodesia; also in tropical Asia, America and Australia. Widespread in the central provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed of marshy places.

97 ***Ammannia baccifera* L.**, Sp. Pl. :120 (1753); Hiern in F.T.A. 2:478 (1871); Broun & Massey, F.S. :90 (1929); Andr., F.P.S. 1:138 (1950); Keay, F.W.T.A. ed. 2, 1:165 (1954); Cuf., Enum. :607 (1959).

A. attenuata Hochst. ex A. Rich., Tent. Fl. Abyss. 1:278 (1841).

[*A. salicifolia* sensu Hiern in F.T.A. 2:478 (1871), pro parte, *non* Monti (1767).]

DARFUR Jebel Marra, massif, 1900 m; *Kassas* 734 (KHU & CAI!).

DISTRIBUTION Ghana to Nigeria eastwards to the Somali Republic and south through E. Africa to the Transvaal and SW. Africa; also in southern Asia and Australia. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

98 ***Ammannia prieureana* Guill. & Perr.**, Fl. Seneg. Tent. :303 (1833); Keay, F.W.T.A. ed. 2, 1:164 (1954).

[*A. senegalensis* sensu Hiern in F.T.A. 2:477 (1871); pro parte, *non* Lam. (1792).]

DARFUR Jebel Marra, massif, 1780 m; *Kassas* 360:4 & 861 (both KHU & CAI!).

DISTRIBUTION Senegal to Nigeria eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Rhodesia and Mozambique.

FLORISTIC CATEGORY Sudano-Zambezian Region.

99 ***Ammannia* sp. aff. *A. senegalensis* Lam.**

DARFUR Jebel Marra, piedmont, 1160 m; stream bank. *Wickens* 2967.

This specimen has the large capsules and 8 stamens of *A. auriculata*, the attenuate leaves of *A. senegalensis* and may possibly be of hybrid origin.

100 ***Nesaea dodecandra* (DC.) Koehne** in Engl., Bot. Jahrb. 3:334 (1882) & in Engl., Pflanzenr. Lythr. :234 (1903); Keay, F.W.T.A. ed. 2, 1:166 (1954); Cuf., Enum. :610 (1959). *Ammannia dodecandra* DC. in Mém. Soc. Phys. Genève. 3:89, t.2 (1825).

Nesaea candollei Guill. & Perr., Fl. Seneg. 1:307 (1833); Hiern in F.T.A. 2:473 (1871).

DARFUR Lowland plain, 650–1000 m; savanna. *Wickens* 20007 & 2022.

DISTRIBUTION Senegal (type locality), Sudan Republic and Ethiopia (*vide* Koehne and Cufodontis). Two possible records from eastern Sudan—plants with almost sessile flowers.

FLORISTIC CATEGORY Sudanian and ?Afrooriental Domains.

Note: The taxonomy of this and allied species needs further investigation, including cytological investigations in order to determine the relationship between the 4-, 6- and 7-merous flowers.

101 ***Rotala tenella* (Guill. & Perr.) Hiern** in F.T.A. 2:467 (1871); Broun & Massey, F.S. :89 (1929); Andr., F.P.S. 1:141 (1950); Keay, F.W.T.A. ed. 2, 1:164 (1954).

Ammannia tenella Guill. & Perr., Fl. Seneg. 1:297 (1833).

DARFUR Jebel Marra, piedmont, 1160 m; marsh. *Wickens* 1590.

DISTRIBUTION Senegal and Mali across to the southern provinces of the Sudan Republic and south through E. Africa and Congo Republic to the Transvaal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

102 ***Woodfordia uniflora* (A. Rich.) Koehne** in Engl., Bot.

Jahrb. 1:334 (1881) & in Engl., Pflanzenr. Lythr. :80 (1903); Andr., F.P.S. 1:143 (1950); Keay, F.W.T.A. ed. 2, 1:163 (1954); Cuf., Enum. :610 (1959); Quézel, Dossier 5:106 (1969).

Grislea uniflora A. Rich., Tent. Fl. Abyss. 1:281 (1847).

[*Woodfordia floribunda* sensu Hiern in F.T.A. 2:481 (1871); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :89 (1929), *non* Salisb. (1806).]

DARFUR Jebel Marra, piedmont and massif, 1160–1760 m; savanna. *Lynes* 28a, 28b (BM!) & 28c; *Macintosh* 37; *Dandy* 54 (BM!); *Pettel* 157; *Wickens* 989 & 1169.

DISTRIBUTION N. Nigeria and N. Cameroons, Sudan Republic (Jebel Marra and Nuba Mountains), Ethiopia and Uganda (Map 48).

FLORISTIC CATEGORY Afro-montane.

Note: A genus of two species, the second, *W. fruticosa* (L.) S. Kurz has a range extending from Madagascar across to SE. Arabia, India and SE. Asia.

Onagraceae

103 **Epilobium hirsutum** L., Sp. Pl. :347 (1753); excl. var. *β*; Oliver, F.T.A. 2:487 (1871); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :92 (1929); Andr., F.P.S. 1:143 (1950); Brenan, F.T.E.A. Onagr. :2 (1953); Cuf., Enum. :633 (1959); Bizzarri & Raven in Webbia 27:473, fig. 2, map 1 (1972).

E. hirsutum L. var. *villosissimum* Koch, Syn. Fl. Germ. Helv. ed. 1, :240 (1835); Brenan, F.T.E.A. Onagr. :2, fig. 1/1 (1953); Wickens, For. Bull. 14(N.S.) :6 (1969).

E. mirei Quézel in Bull. Soc. Hist. Nat. Afr. Nord. 48:90 (1957) & Miss. Bot. Tibesti. :154, fig. 6B (1958).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; stream banks. *Lynes* s.n.; *Macintosh* 117; *Dandy* 169 (BM!) *Aglen* 35; *Jackson* 3292; *Robertson* 117; *Wickens* 1009 & 1412. Vernacular name: (Fur) *jugud*.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to Angola and the Cape; also from Scandinavia southwards, the Mediterranean region and extending through Asia to China.

FLORISTIC CATEGORY Palaearctic Kingdom with Afrioriental and Zambezan extensions.

Note: Brenan, *l. c.*, comments on the unusual uniformity of the species in Africa suggesting the possibility of a relatively recent and rapid migration southwards of a single race capable of withstanding African conditions.

104 **Ludwigia octovalvis** (Jacq.) Raven in Kew Bull. 15:476 (1962).

subsp. **brevisepala** (Brenan) Raven in Kew Bull. 15:476 (1962) & in Reinwardtia 6:365 (1963); Bizzarri & Raven in Webbia 27:491, fig. 6, map 2 (1972).

[*Jussiaea villosa* sensu Oliver, F.T.A. 2:489 (1871); Broun & Massey, F.S. :91 (1929), incl. var. *linearis* (Willd.) Oliver, *non* Lam. (1789).]

J. suffruticosa L. var. *linearis* (Willd.) Oliver ex Kuntze, Rev. Gen. Pl. 1:251 (1891); Andr., F.P.S. 1:145, fig. 87 (1950); Brenan, F.T.E.A. Onagr. :15 (1953) & in F.W.T.A. ed. 2, 1:169 (1954); Wickens, For. Bull. 14(N.S.) :6 (1969).

J. suffruticosa L. var. *brevisepala* Brenan in Kew Bull. 8:168 (1953), F.T.E.A. Onagr. :14 (1953) & in F.W.T.A. ed. 2, 1:169 (1954); Wickens, For. Bull. 14(N.S.) :6 (1969).

J. suffruticosa L. var. *pilosa-linearis* Brenan in Kew Bull. 8:169 (1953), F.T.E.A. Onagr. :15 (1953) & in F.W.T.A. ed. 2, 1:169 (1954).

Ludwigia pubescens (L.) Hara var. *brevisepala* (Brenan) Hara in Journ. Jap. Bot. 28:294 (1953); Cuf., Enum. :632 (1959).

DARFUR Lowland plain, 1020 m; seasonally inundated swamp. *Wickens* 2745.

DISTRIBUTION Senegal and the central and southern provinces of the Sudan Republic southwards to Angola and Mozambique.

FLORISTIC CATEGORY Sudano-Zambezan Region.

105 **Ludwigia stolonifera** (Guill. & Perr.) Raven in Reinwardtia 6:390 (1963); Bizzarri & Raven in Webbia 27:497, fig. 9, map 2 (1972).

Jussiaea stolonifera Guill. & Perr., Fl. Seneg. :292 (1833).

J. diffusa Forsk., Fl. Aegypt.-Arab. :210 (1775); Oliver, F.T.A. 2:488 (1871); Broun & Massey, F.S. :91 (1929); Andr., F.P.S. 1:144 (1950).

J. repens L. var. *diffusa* (Forsk.) Brenan in Kew Bull. 8:171 (1953), F.T.E.A. Onagr. :19, fig. 2/8 (1953) & in F.W.T.A. ed. 2, 1:170 (1954).

Ludwigia adscendens (L.) Hara var. *diffusa* (Forsk.) Hara in Journ. Jap. Bot. 28:291 (1953); Cuf., Enum. :631 (1959).

L. adscendens (L.) Hara subsp. *diffusa* (Forsk.) Raven in Kew Bull. 15:476 (1962).

DARFUR Jebel Marra, piedmont, *c.* 1200 m; lowland plain, 1020 m; marshy ground. *Wickens* 1358; *Kamil* 1168. Vernacular name: (Fur) *kwoi kwoi*; (Arabic) *kormano*.

DISTRIBUTION Throughout Africa except for the Cape; also in western Asia. Frequent in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan.

Haloragaceae

106 **Laurembergia tetrandra** (Schott) Kanitz in Fl. Brasil.

13(2) :370 (1882); A. Raynal in Webbia 19:693 (1965); Boutique & Verdcourt, F.T.E.A. Halorag. :4, fig. 2 (1973).

subsp. **brachypoda** (Hiern) A. Raynal in Webbia 19:694 (1965); Boutique, Fl. Congo, Halorag. :5 (1968); Boutique & Verdcourt, F.T.E.A. Halorag. :6 (1973).

var. **brachypoda**; A. Raynal *l.c.*; Boutique *l.c.*; Boutique & Verdcourt *l.c.*, fig. 2/1–6.

[*Serpicula repens* sensu Oliver, F.T.A. 2:405 (1871), *non* L. (1767)] *Serpicula repens* L. var. *brachypoda* Hiern, Cat. Afr. Pl. Welw. 1:332 (1896).

Laurembergia engleri Schindler in Engl., Pflanzenr. IV, 225 :73, fig. 21 (1905); Broun & Massey, F.S. :92 (1929); Andr., F.P.S. 1:147 (1950); Keay, F.W.T.A. ed. 2, 1:171 (1954).

DARFUR Jebel Marra, massif, 2450 m; marshy stream bank.

Wickens 2681.

DISTRIBUTION Senegal east to the southern provinces of the Sudan Republic southwards to Angola and Mozambique.

FLORISTIC CATEGORY Sudano-Zambezan Region (species pantropical).

107 **Myriophyllum spicatum** L., Sp., Pl. :992 (1753); Cuf., Enum. :634 (1959); Boutique & Verdcourt, F.T.E.A. Halorag. :7 (1973).

DARFUR Jebel Marra, piedmont, 1160 m; aquatic. *Wickens* 1011, 1516 & 1594.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Tanzania, Zambia and S. Africa; throughout most countries of the world, but absent from Australia and S. America.

FLORISTIC CATEGORY Subcosmopolitan.

Thymelaeaceae

108 **Lasiosiphon kraussianus** (Meisn.) Burt-Davy, Man. Fl. Pl. Transv. 1:207 (1926); Keay, F.W.T.A. ed. 2, 1:176, fig. 65 (1954).

Gnidia kraussiana Meisn. in Hook., Lond. Journ. Bot. 2:552 (1843); Andr., 1:150, fig. 89 (1950).

Lasiosiphon kraussii Meisn. in DC., Prodr. 14:596 (1857); Pearson in F.T.A. 6(1):231 (1913); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :93 (1929), *nom. superfl.*

L. kerstingii H.H.W. Pearson in F.T.A. 6(1):233 (1913).

DARFUR Jebel Marra, piedmont and massif, 1160–2600 m; savanna and upland grassland. *Lynes* 49, 52, 52b & 70; *Macintosh* 35 & 76; *Aglen* 37; *Jackson* 3389; *Wickens* 967, 2664, 2921 & 2971; *Abdel Gadir* & *Pettet* in *Kassas* 723 (KHU & CAI, n.v.).

Vernacular name: (Fur) *kourra komma* or *majaria*; (Arabic) *mahajiria*. Poisonous to stock.

DISTRIBUTION Guinée Republic to N. Nigeria eastwards to the central and southern provinces of the Sudan Republic and south through E. Africa to Mozambique, Rhodesia and Botswana.

FLORISTIC CATEGORY Sudano-Zambezan Region.

Nyctaginaceae

109 **Boerhavia coccinea** Mill., Gard. Dict. No. 4 (1768); Cuf., Enum. :76 (1953); Meikle in F.W.T.A. ed. 2, :178 (1954); Quézel, Dossier 5:107 (1969); Wickens, For. Bull. 14(N.S.) :7 (1969).

B. repens L. var. *diffusa* (L.) Hook.f., Fl. Brit. Ind. 4:709 (1885), pro parte; Baker & Wright in F.T.A. 6(1):5 (1913), pro parte; Broun & Massey, F.S. :94 (1929), pro parte; Andr., F.P.S. 1:151 (1950), pro parte.

DARFUR Lowland plain, 1020–1100 m; arable lands and waste places. *Lynes* 593; *Wickens* 1783.

DISTRIBUTION Widely distributed throughout the tropics.

Widespread in the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

110 **Boerhavia diffusa** L., Sp. Pl. :3 (1753); Baker & Wright in F.T.A. 6(1):4 (1913), excl. vars.; Cuf., Enum. :76 (1953); Meikle in F.W.T.A. ed. 2, 1:178 (1954); Wickens, For. Bull. 14 (N.S.) :6 (1969).

B. repens L. var. *diffusa* (L.) Hook.f., Fl. Brit. Ind. 4:709 (1885), pro parte; Baker & Wright in F.T.A. 6(1):5 (1913), pro parte; Broun & Massey, F.S. :94 (1929), pro parte; Andr., F.P.S. 1:151 (1950), pro parte.

B. adscendens Willd., Sp. Pl. 1:19 (1797); Baker & Wright in F.T.A. 6(1):4 (1913); Broun & Massey, F.S. :94 (1929).

DARFUR Lowland plain, 1020 m; arable lands and waste places. *Wickens* 1158 & 1753a.

DISTRIBUTION Widely distributed throughout the tropics.

Widespread in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

111 **Commicarpus africanus** (Lour.) Cuf. [Enum. :79 (1953) *comb. inval.*] in Bull. Jard. Bot. Nat. Belge 39(4), Suppl. :xxi (1969).

Boerhavia africana Lour., Fl. Coch. 1:16 (1970).

B. plumbaginea Cav., Icon. Pl. 2:7, t.112 (1793); Baker & Wright in F.T.A. 6(1):6 (1913); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :95 (1929).

Commicarpus plumbagineus (Cav.) Standley in Contrib. U.S. Nat. Herb. 18:101 (1916); Meikle in F.W.T.A. ed. 2, 1:177 (1954); Quézel, Dossier 5:107 (1969).

C. africanus (Lour.) Dandy ex Andr., F.P.S. 1:152, fig. 91 (1950) excl. syn. *Boerhavia pentandra* Burch.

DARFUR Jebel Marra, massif, c. 1200–1600 m; *Lynes* 155; *Macintosh* 29, 101 & 102.

DISTRIBUTION Widely distributed in tropical and southern Africa; also in N. Africa, SW. Europe, Mediterranean, Arabia and Madagascar. Also occurs in the eastern central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian, Madagascan & Mediterranean Regions.

112 **Commicarpus pentandrus** (Burch.) Heimerl in Engl. & Prantl, Pflanzenfam. ed. 2, 16C:117 (1934); Cuf., Enum. :80 (1957).

Boerhavia pentandra Burch., Trav. 1:432 (1822); Baker & Wright in F.T.A. 6(1):7 (1913); Broun & Massey, F.S. :95 (1929).

B. grandiflora A. Rich., Tent. Fl. Abyss. 2:209 (1851).

Commicarpus grandiflorus (A. Rich.) Standley in Contrib. U.S. Nat. Herb. 18:101 (1916); Wickens, For. Bull. 14(N.S.) :7 (1969).

?*C. montanus* de Miré, Gillet & Quézel in Univ. Alger. Inst. Rech. Sahar. Mém. 4, :130 (1958); Quézel, Dossier 5:107 (1969).

C. africanus (Lour.) Dandy ex Andr., F.P.S. 1:152, fig. 91 (1950), pro parte quoad syn. *Boerhavia pentandra* Burch.

DARFUR Jebel Marra, piedmont, foothills and massif, 1090–1770 m; savanna. *Macintosh* 134; *Jackson* 3306; *Wickens* 1406, 1659, 1836 & 2577. Vernacular name: (Fur) *daagei* or *dergi*.

DISTRIBUTION Northern and central provinces of the Sudan Republic and Ethiopia southwards through E. Africa to Mozambique, Rhodesia and Angola; also in Senegal, SW. Africa, Arabia and tropical Asia (fide Cufodontis).

FLORISTIC CATEGORY Afriental & Zambezian Domains.

Cochlospermaceae

113 **Cochlospermum tinctorium** A. Rich. in Guill. & Perr., Fl. Seneg. :99, t.21 (1831); Oliver, F.T.A. 1:113 (1868), excl. syn.

C. planchonii Hook.f.; Andr., F.P.S. 1:155, fig. 92 (1950), pro parte; Keay, F.W.T.A. ed. 2, 1:185, fig. 70, A-G (1954); Verdec., F.T.E.A. Cochlosp. :1, fig. 1 (1975).

C. niloticum Oliver, F.T.A. 1:113 (1868); Broun & Massey, F.S. :96 (1929).

DARFUR Lowland plain, 800 m. *Robertson* 108.

DISTRIBUTION Senegal to Cameroon, central and southern provinces of the Sudan Republic and Uganda.

FLORISTIC CATEGORY Sudanian Domain.

Flacourtiaceae

114 **Casearia barteri** Masters in F.T.A. 2:494 (1871); Keay, F.W.T.A. ed. 2, 1:198 (1954); Sleumer in Bull. Jard. Bot. Nat. Belg. 41:406, fig. 3 (1971).

DARFUR Jebel Marra, massif, 1840 m; gallery forest. *Wickens* 986; *de Wilde* 5582 (WAG, *n.v.*). I am indebted to Dr. Sleumer for informing me of the record at Wageningen.

DISTRIBUTION Sierra Leone to the Gabon and eastwards through northern Congo to the Sudan Republic (Jebel Marra) (Map 49).

FLORISTIC CATEGORY Guineo-Congo Region.

Passifloraceae

115 **Adenia rumicifolia** Engl. & Harms, Pflanzenw. Afr. 3,2:603 (1921); de Wilde, Meded. Landbouw. Wageningen 71, 18:154 (1971) & F.T.E.A. Passifl. :34, fig. 7 (1975).

var. **rumicifolia**; de Wilde, Meded. Landouw. Wageningen 71, 18:156, fig. 24 (1971).

DARFUR Jebel Marra, massif, 1650 m; gallery forest. *de Wilde* 5427 (WAG, *n.v.*).

DISTRIBUTION Port. Guinea to Cameroon and eastwards to Ethiopia and south through E. Africa to Mozambique and Angola (Map—see de Wilde *l. c.*, fig. 24). Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Guineo-Congo and Sudano-Zambezian Regions.

116 **Adenia venenata** Forsk. Fl. Aegypt.-Arab. :77 (1775); Broun & Massey, F.S. :98 (1929); Andr., F.P.S. 1:161, fig. 96 (1950); Keay, F.W.T.A. ed. 2, 1:203 (1954); Cuf., Enum. :600 (1959); de Wilde, Meded. Landbouw. Wageningen 71, 18:133, fig. 18 (1971) & F.T.E.A. Passifl. :30, fig. 6 (1975). *Modecca abyssinica* Hochst. ex A. Rich., Tent. Fl. Abyss. 1:297 (1847); Masters in F.T.A. 2:514 (1871).

DARFUR Jebel Marra, foothills, 1130–1525 m; *Acacia mellifera* scrub and basalt rocks. *Wickens* 1368 & 3005.

DISTRIBUTION N. Nigeria, Cameroon, southern provinces of the Sudan Republic, Ethiopia, Somali Republic, Uganda, Kenya and Tanzania (Map 50).

FLORISTIC CATEGORY Sudanian and Afriental Domains.

Cucurbitaceae

117 *Citrullus lanatus* (Thunb.) Mansf. in Kulturpflanzen, Beih. 2 :421 (1959); Cuf., Enum. 1041 (1965); Jeffrey, F.T.E.A. Cucurb. :46, fig. 5/1–5 (1967).

Momordica lanata Thunb., Prodr. Fl. Cap. :13 (1800).

Citrullus vulgaris Ecklon & Zeyher, Enum. :279 (1836); Hook.f. in F.T.A. 2:549 (1871); Broun & Massey, F.S. :164 (1929).

Colocynthus citrullus (L.) Kuntze, Rev. Gen. 1:256 (1891); Andr., F.P.S. 1:168 (1950); Keay, F.W.T.A. ed. 2, 1:213 (1954).

DARFUR Lowland plain, 1070 m. *Lynes* 557. Vernacular name: (Fur) *burto*; (Arabic) *battikh*.

DISTRIBUTION Widespread in tropical and southern Africa; also the Mascarene Is. and tropical Asia. Widely distributed throughout the Sudan, often cultivated.

FLORISTIC CATEGORY Palaeotropical.

118 *Coccinia adoënsis* (A. Rich.) Cogn. in DC., Monogr. Phan. 3:538 (1881); Cuf., Enum. :1049 (1965); Jeffrey, F.T.E.A. Cucurb. :65, fig. 8/1–7 (1967); Wickens, For. Bull. 14(N.S.) :7 (1969).

Momordica adoënsis A. Rich., Tent. Fl. Abyss. 1:293 (1847).

Coccinea djurensis Gilg in Engl., Bot. Jahrb. 34:357 (1904); Andr., F.P.S. 1:166 (1950).

[*Cephalandra diversifolia* sensu Broun & Massey, F.S. :105 (1929), *non* Naudin (1866).]

[*Coccinia diversifolia* sensu Andr., F.P.S. 1:166 (1950), *non* (Naudin) Cogn. (1881).]

C. sp. C of Keay, F.W.T.A. ed. 2, 1:216 (1954).

DARFUR Lowland plain, 1020 m; savanna. *Wickens* 1800.

DISTRIBUTION N. Nigeria eastwards to Ethiopia, SE. Congo Republic, Rhodesia, Malawi, Mozambique and the Transvaal. Widely distributed in the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

119 *Coccinia grandis* (L.) Voigt, Hort. Suburb. Calc. :59 (1845); Andr., F.P.S. 1:165, fig. 98 (1950); Keay, F.W.T.A. ed. 2, 1:215, fig. 85 (1954); Cuf. Enum. :1049 (1965); Jeffrey, F.T.E.A. Cucurb. :68, fig. 8/8–10 (1967).

Bryonia grandis L., Mant. 1:126 (1767).

Cephalandra indica Naudin in Ann. Sci. Nat. V, 5:16 (1866); Hook.f. in F.T.A. 2:550 (1871); Broun & Massey, F.S. :105 (1929), *nomen illegit*.

C. moghadd (J. F. Gmelin) Schweinf., Beitr. Fl. Aethiop. :251 (1867); Broun & Massey, F.S. :105 (1929).

[*C. quinqueloba* sensu Hook.f. in F.T.A. 2:551 (1871); Broun & Massey, F.S. :105 (1929); pro parte, quoad spec. cit. *Grant*, *non* Ecklon & Zeyher (1836).]

DARFUR Lowland plain, 600 m; riverbank. *Wickens* 2016.

Vernacular name: (Fur) *nussa*; (Arabic) *aggur* or *faggus*. Fruit eaten by stock.

DISTRIBUTION Senegal and N. Nigeria eastwards to the Somali Republic, Uganda, Kenya and Tanzania; also in Arabia, tropical Asia and Australia; introduced into the West Indies and tropical S. America. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Palaeotropical.

120 *Cucumis ficifolius* A. Rich., Tent. Fl. Abyss. 1:294, t.53 bis (1847); Andr., F.P.S. 1:174 (1950); Cuf., Enum. :1042 (1965); Jeffrey, F.T.E.A. Cucurb. :100, fig. 16/1–7 (1967); Quétel, Dossier 5:107 (1969), *non* sensu A. Meeuse in Bothalia 8:81 (1962).

C. figarei Naudin in Ann. Sci. Nat. IV, 11:17 (1859); Broun & Massey, F.S. :102 (1929), et sensu Hook.f. in F.T.A. 2:544 (1871), pro parte, excl. spec. cit. *Welwitsch* & *Kirk* et excl. syn. *C. chrysocomus* Schumacher.

DARFUR Lowland plain, 1100 m. *Lynes* 556.

DISTRIBUTION North-eastern provinces of the Sudan Republic, Ethiopia, Uganda, Kenya and Tanzania.

FLORISTIC CATEGORY Sahelian and Afrioriental Domains.

121 *Kedrostis hirtella* (Naudin) Cogn. in DC., Monogr. Phan. 3:644 (1881); Cuf., Enum. :1034 (1965); Jeffrey, F.T.E.A. Cucurb. :133, fig. 23/1–6 (1967); Wickens, For. Bull. 14(N.S.) :7 (1969).

Rhynchocharpa hirtella Naudin in Ann. Sci. Nat. IV, 16:181 (1862); Hook.f. in F.T.A. 2:564 (1871).

Kedrostis cufodontii Chiov., Miss. Biol. Borana Racc. Bot. Ang-Gym :236, fig. 75 (1934); Cuf., Enum. :1033 (1965).

DARFUR Jebel Marra, massif, 1975 m; rock crevices. *Wickens* 1843.

Vernacular name: (Arabic) *eair*.

DISTRIBUTION Senegal eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal, SW. Africa and Angola. No further records seen for the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

122 *Lagenaria siceraria* (Molina) Standley in Publ. Field Mus. Nat. Hist. Chicago, Bot., ser. 3:435 (1930); Andr., F.P.S. 1:175 (1950); Keay, F.W.T.A. ed. 2, 1:206 (1954); Cuf., Enum. :1046 (1965); Jeffrey, F.T.E.A. Cucurb. :51, fig. 6/9 (1967).

Cucurbita siceraria Molina, Sagg. Chil. :133 (1782).

Lagenaria vulgaris Ser. in Mém. Soc. Phys. Genève. 3:25 t.2 (1825); Hook.f. in F.T.A. 2:529 (1871); Broun & Massey, F.S. :99 (1929).

L. abyssinica (Hook.f.) C. Jeffrey var. *somaliensis* (Chiov.) Cuf., Enum. :1046 (1965).

DARFUR Lowland plain, 1100 m. *Lynes* 555a. The Bottle Gourd is a very common climber on the compound fences at Zalingei etc.

DISTRIBUTION Widely distributed throughout the tropics but probably introduced into those countries outside Africa and Asia. Widespread through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

123 *Luffa cylindrica* (L.) M. J. Roem., Syn. Monogr. 2:63 (1846); Broun & Massey, F.S. :99 (1929); Hassib, Cucurb. Egypt. :50 figs. 21 & 22 (1938); Cuf., Enum. :1040 (1965); Jeffrey, F.T.E.A. Cucurb. :76, fig. 10 (1967).

Momordica cylindrica L., Sp. Pl. :1009 (1753).

M. luffa L., Sp. Pl. :1009 (1753).

Luffa aegyptiaca Miller, Gard. Dict. ed. 8 (without pagination) (1768); Hook.f. in F.T.A. 2:530 (1871); Andr., F.P.S. 1:175 (1950); Keay, F.W.T.A. ed. 2, 1:207 (1954).

DARFUR Lowland plain, 1020 m; village compounds, waste places and arable lands. *Wickens* 1750. Vernacular name: (Fur) *leafa*; (Arabic) *luffa*. The familiar luffa of commerce. The fruit fibres are used locally as cleaning squabs and as filter for coffee.

DISTRIBUTION Widely distributed in the tropics and sub-tropics as an escape from cultivation; doubtfully native of tropical E. Africa. Widespread in the Sudan.

FLORISTIC CATEGORY Pantropical.

124 *Momordica balsamina* L., Sp. Pl. :1009 (1753); Hook.f. in F.T.A. 2:537 (1871); Broun & Massey, F.S. :100 (1929); Hassib, Cucurb. Egypt. :47, fig. 20 (1938); Andr., F.P.S. 1:181, fig. 106 (1950); Keay, F.W.T.A. ed. 2, 1:212 (1954); Cuf., Enum. :1037 (1965); Jeffrey, F.T.E.A. Cucurb. :32 (1967); Quétel, Dossier 5:107 (1969).

DARFUR Lowland plain, 900 m; arable lands. *Wickens* 1377. Vernacular name: (Arabic) *jereh*.

DISTRIBUTION Widespread in the drier parts of tropical and southern Africa; also in Arabia, tropical Asia and Australia; probably introduced into tropical America. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

125 *Momordica charantia* L., Sp. Pl. :1009 (1753); Hook.f. in F.T.A. 2:537 (1871); Broun & Massey, F.S. :101 (1929); Hassib, Cucurb. Egypt. :46, fig. 19 (1938); Andr., F.P.S. 1:181, fig. 105 (1950); Keay, F.W.T.A. ed. 2, 1:212, fig. 84 (1954); Cuf., Enum. :1038 (1965); Jeffrey, F.T.E.A. Cucurb. :31 (1967).

DARFUR Lowland plain, 1020 m; arable lands. *Wickens* 1762.

DISTRIBUTION Throughout the tropics, but probably introduced into tropical America. Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

- 126 ***Zehneria minutiflora*** (Cogn.) Jeffrey in Kew Bull. 15:366 (1962) & F.T.E.A. Cucurb. :126, fig. 21/9-10 (1967).
Z. micrantha Hook.f. in F.T.A. 2:560 (1871), non F. Muell. (1860), nom. illegit.
Melothria minutiflora Cogn. in DC., Monogr. Phan. 3:611 (1881); Keay, F.W.T.A. ed. 2, 1:209 (1954), incl. vars.
 DARFUR Jebel Marra, massif, c. 1350 m. *Kassas* 279 & 323 (both KHU & CAI!).
DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra), Ethiopia, E. Africa and Rhodesia.
FLORISTIC CATEGORY Afro-montane (Map 51).

- 127 ***Zehneria peneyana*** (Naudin) Aschers. & Schweinf. in Schweinf., Beitr. Fl. Aethiop. :268 (1867); Jeffrey, F.T.E.A. Cucurb. :127, fig. 21/13 (1967); Wickens, For. Bull. 14(N.S.) :7 (1969).
Pilogyne peneyana Naudin in Ann. Sci. Nat. V, 5:38 (1866).
Melothria peneyana (Naudin) Cogn. in DC., Monogr. Phan. 3:592 (1881); Andr., F.P.S. 1:177 (1950).
 DARFUR Jebel Marra, piedmont, 1160 m; cultivated alluvial soils. *Wickens* 974 & 1814.
DISTRIBUTION Central provinces of the Sudan Republic, Kenya and Tanzania; also in Madagascar.
FLORISTIC CATEGORY Sahelian and Afriental Domains and Madagascar Region.

Cactaceae

- 128 ***Opuntia cochenillifera*** (L.) Miller, Gard. Dict. ed. 8 (without pagination) (1768), as *O. cochinelifera*; D. Hunt, F.T.E.A. Cact. :3 (1968).
Cactus cochenillifera L., Sp. Pl. :468 (1753).
 DARFUR Jebel Marra, massif, 1775 m; basalt gorge. *Wickens* 1421.
 Vernacular name (Fur & Arabic) *tin abu shok*.
DISTRIBUTION Probably native of Jamaica and tropical America, widely cultivated.
FLORISTIC CATEGORY Neotropical cultigen.

Myrtaceae

- 129 ***Syzygium guineense*** (Willd.) DC., Prodr. 3:259 (1828); Broun & Massey, F.S. :107 (1929); Andr., F.P.S. 1:190, fig. 109 (1950); Keay, F.W.T.A. ed. 2, 1:240 (1954); Cuf., Enum. :627 (1959).
Calyptanthus guineensis Willd., Sp. Pl. 2:974 (1800).
Eugenia guineensis (Willd.) Baillon ex Lanessan, Pl. Util. Col. Fr. :822 (1886); Norman in Journ. Bot. 62:137 (1924).
 subsp. **guineense**; Boutique, Fl. Congo, Myrtac. :13, fig. 2A (1968).
Syzygium guineense (Willd.) DC. var. *guineense*; Keay, F.W.T.A. ed. 2, 1:240, figs. 95D & 96 (1954); Wickens, For. Bull. 14(N.S.) :7 (1969).
 DARFUR Jebel Marra, massif and piedmont, 1070-2450 m; stream banks and gallery forests. *Lynes* s.n., 68 & 80; *Dandy* 177 (BM!); *Drar* 2041; *Jackson* 2561 (FHO, n.v.); *Wickens* 1070, 1306, 1436, 1525, 1924 & 2866; *Kassas* 1192.
DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic and southwards through E. Africa to S. Africa. Widely distributed in the central and southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

Melastomataceae

- 130 ***Derosiphia tubulosa*** (Smith) Raf., Sylva Tell. :101 (1838); A. & R. Fernandes in Bol. Soc. Brot. II, 43:285 (1969).
Osbeckia tubulosa Smith in Rees, Cyclop. 25:058, no. 5 (1813); Hook.f. in F.T.A. 2:442 (1871); Keay, F.W.T.A. ed. 2, 1:247, fig. 99 (1954); A. & R. Fernandes in Garcia de Orta 2:174 (1954).
Dissotis tubulosa (Smith) Triana in Trans. Linn. Soc. Bot. 28:58 (1871); A. & R. Fernandes in Mem. Soc. Brot. 11:33 (1956).
 DARFUR Lowland plain, 1030 m; rock crevices (Jebel Sirmi).
Wickens 2328 & 2756.
DISTRIBUTION Senegal to Cameroon, also Sudan Republic (Jebel Marra) (Map 52).
FLORISTIC CATEGORY Guinea and Sudanian Domains.

Combretaceae

- 131 ***Anogeissus leiocarpus*** (DC.) Guill. & Perr., Fl. Seneg. 1:280, t.65 (1833); Lawson in F.T.A. 2:418 (1871); Broun & Massey, F.S. :112 (1929); Keay, F.W.T.A. ed. 2, 1:280, fig. 106 (1954); Cuf., Enum. :624 (1959); Sahni, Trees N. Sud. 1:7, fig. 5 (1968); Quézel, Dossier 5:108 (1969); Wickens, For. Bull. 14(N.S.) :8 (1969).
Conocarpus leiocarpus DC., Prodr. 3:16 (1828).
Anogeissus schimperi Hochst. ex Hutch. & Dalz., F.W.T.A. ed. 1, 1:227 (1927); Andr., F.P.S. 1:197, fig. 111 (1950).
 DARFUR Jebel Marra, piedmont, foothills and massif, 1160-1765 m; lowland plain, 1050-1100 m; savanna, one of the dominant species. *Lynes* 551 (BM!); *Dandy* 44 (BM!); *Francis* 14; *Wickens* 1505, 1569, 1765 & 1925; *Kassas* 763 (KHU & CAI, n.v.).
 Vernacular name: (Fur) *deru*; (Arabic) *sahab*. A useful pole timber. A tea-like beverage is made from the twigs. The bark is used for tanning.
DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia (Map 53). Widely distributed in the central provinces of the Sudan, often dominant tree species in the southern provinces.
FLORISTIC CATEGORY Guinean and Sudanian Domains.
- 132 ***Combretum aculeatum*** Vent., Choix Pl. :sub. 58 (1803); Lawson in F.T.A. 2:423 (1871); Broun & Massey, F.S. :115 (1929); Andr., F.P.S. 1:199, fig. 112 (1950); Keay, F.W.T.A. ed. 2, 1:273 (1954); Cuf., Enum. :615 (1959); Quézel, Dossier 5:108 (1969); Wickens, F.T.E.A. Combret. :60, fig. 7/36 (1973).
 DARFUR Jebel Marra, piedmont and foothills, 1020-1770 m; lowland plain, 100-1020 m; savanna. *Francis* 12; *Wickens* 1117, 1295, 1319 & 2955. Vernacular name: (Fur) *zungar tar*; (Arabic) *said* or *shaheit*. Broused by stock.
DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south into Uganda, Kenya and Tanzania (Map 54). Widely distributed throughout the Sudan.
FLORISTIC CATEGORY Sahelian, Sudanian and Afriental Domains.

- Combretum collinum*** Fresen. in Mus. Senckenb. 2:153 (1837); Okafor in Bol. Soc. Brot. II, 41:140 (1967); Wickens, F.T.E.A. Combret. :24, fig. 1/10 & 3/10 (1973).
 The two subspecies present in the Jebel Marra area may be distinguished according to the following key:
 Leaves distinctly hairy beneath, at least on the midrib; scales on the lower leaf surface cup or bowl shaped; scales red and sparse on the fruit. subsp. *hypopilinum*.
 Leaves glabrous beneath; scales discoid; scales red and conspicuous on the fruit. subsp. *binderanum*.
- 133 subsp. **binderanum** (Kotschy) Okafor in *op. cit.* :141 (1967); Wickens *op. cit.* :26, figs. 1/10b & 4/10a (1973).
C. binderanum Kotschy in Sitz. Ber. Math.-Nat. Akad. Wiss. Wien Cl. 51:363, t.5 (1865); Andr., F.P.S. 1:199 (1950); Keay, F.W.T.A. ed. 2, 1:271 (1954).

C. populifolium Engl. & Diels in Engl., Monogr. Afr. Pflanzen. 3:54 (1899); Broun & Massey, F.S. :114 (1929).

DARFUR Lowland plain, 950–1000 m; savanna. *Francis* 84; *Wickens* 1612. Vernacular name: (Arabic) *habil*.

DISTRIBUTION Ivory Coast to Nigeria eastwards to Ethiopia and south to Uganda, Kenya and Tanzania. Widely distributed in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

134 subsp. **hypopilinum** (*Diels*) *Okafor* in *op. cit.* :142 (1967); *Wickens, op. cit.* :25, figs. 1/10a–d (1973).

C. hypopilinum Diels in Engl., Bot. Jahrb. 39:497 (1907).

C. verticillatum Engl., Monogr. Afr. Pflanzen 3:52, t.16B (1899); Broun & Massey, F.S. :114 (1929); Andr., F.P.S. 1:203 (1950).

DARFUR Jebel Marra, massif, 7700 m; lowland plain, 750–1000 m; savanna. *Francis* 57 & 72; *Wickens* 1605, 1617 & 2934.

DISTRIBUTION Ivory Coast and Upper Volta eastwards to the southern provinces of the Sudan Republic, and Uganda.

FLORISTIC CATEGORY Sudanian Domain.

135 **Combretum glutinosum** *Perr. ex DC.*, Prodr. 3:21 (1828); Lawson in F.T.A. 2:432 (1871); Broun & Massey, F.S. :113 (1929); Andr., F.P.S. 1:201 (1950); Keay, F.W.T.A. ed. 2, 1:271 (1954); Sahni, Trees N. Sudan :20, fig. 6 (1968).

C. cordofanum Engl. & Diels in Engl., Monogr. Afr. Pflanzen. 3:50, t.14 (1899); Broun & Massey, F.S. :113 (1929); Andr., F.P.S. 1:202 (1950).

DARFUR Jebel Marra, piedmont and massif, 1150–1350 m; lowland plain, 700–1150 m; savanna and fallow lands. *Drar* 2387; *Francis* 39; *Wickens* 1089, 1369, 1555, 1618, 1628, 1632, 2836 & 2898; *Kassas* 151, 293 & 331 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *doafey*; (Arabic) *habil*. A bath in an infusion of the bark and leaves is used for relieving pains at childbirth.

DISTRIBUTION Senegal to Cameroon and eastwards to the central and southern provinces of the Sudan Republic (Map 55).

FLORISTIC CATEGORY Sahelian Domain.

136 **Combretum molle** *R. Br. ex G. Don* in Trans. Linn. Soc. 15:431 (1827); Broun & Massey, F.S. :115 (1929); Andr., F.P.S. 1:201 (1950); Keay, F.W.T.A. ed. 2, 1:270 (1954); Cuf., Enum. :617 (1959); *Wickens*, F.T.E.A. Combret. :33, figs. 2/14 & 5/14 (1973).

C. trichanthum Fresen. in Mus. Senckenb. 2:155 (1837); Lawson in F.T.A. 2:431 (1871); Broun & Massey, F.S. :112 (1929).

C. gueinzii Sond. in Linnaea 23:43 (1850); Andr., F.P.S. 1:202 (1950).

C. splendens Engl., Pflanzenw. Ost-Afr. C:290 (1895); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :114 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; lowland plain, 730–1100 m; savanna. *Lynes* s.n., 112 (BM!) & 552; *Dandy* 43 (BM!); *Drar* 2095, 2097, 2283, 2286, 2287, 2359 & 2396; *Aglen* 7; *Francis* 71 & 78; *Wickens* 1073, 1120, 1277, 1469, 1534, 1540, 1627, 2873 & 2929; *Kassas* 293 & 804 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *dofey dogorgoi* or *dofey kalu* or *gari*; (Arabic) *habil*.

DISTRIBUTION Widely distributed through tropical and southern Africa, also in Arabia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

137 **Combretum paniculatum** *Vent.*, Choix Pl.: sub. 58 (1803); Lawson in F.T.A. 2:425 (1871); Broun & Massey, F.S. :115 (1929); Andr., F.P.S. 1:203 (1950); Keay, F.W.T.A. ed. 2, 1:273 (1954); Cuf., Enum. :618 (1969); *Wickens* in Kew Bull. 26:61 (1971) & F.T.E.A. Combret. :53, figs. 6/29 & 7/29 (1973).

subsp. **paniculatum** *Wickens, op. cit.* :53 (1973).

C. ramosissimum Engl. & Diels in Engl., Monogr. Afr. Pflanzen. 3:72, t.21D (1899).

[*C. cineripetalum* sensu *Wickens*, For. Bull. 14(N.S.): :8 (1969), non Engl. & Diels (1899).]

138 **Guiera senegalensis** *J. F. Gmelin* in Linn., Syst. Nat. ed. 13, 2:675 (1791); Lawson in F.T.A. 2:418 (1871); Broun & Massey, F.S. :112 (1929); Andr., F.P.S. 1:206, fig. 114 (1950); Keay, F.W.T.A. ed. 2, 1:275, fig. 104 (1954); Quétel, Dossier 5:108 (1969).

DARFUR Lowland plain 945–1020 m; degraded savanna. *Lynes* 550; *Francis* 31; *Robertson* 102 & 144. Vernacular name: (Arabic) *ghubeish*.

DISTRIBUTION Senegal to N. Nigeria eastwards to the central provinces of the Sudan Republic to the west of the Nile (Map 56).

FLORISTIC CATEGORY Sahelian Domain.

139 **Terminalia brownii** *Fresen.* in Mus. Senckenb. 2:152, t.9, 1 (1837); Lawson in F.T.A. 2:415 (1871); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :111 (1929); Andr., F.P.S. 1:210, fig. 115 (1950); Griffiths in Journ. Linn. Soc. Bot. 55:893, fig. 26 (1959); Cuf., Enum. :621 (1959); Sahni, Trees N. Sudan :24, fig. 8 (1968); Quétel, Dossier 5:108 (1969); *Wickens*, F.T.E.A. Combret. :90 (1973).

DARFUR Jebel Marra, piedmont and massif, 1000–1830 m; lowland plain, 900 m; savanna, especially riverine. *Lynes* s.n. (BM!); *Francis* 13 & 45; *Wickens* 1625, 1820 & 3007; *Kassas* 221 & 746 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *divia*; (Arabic) *subagh*.

DISTRIBUTION N. Nigeria (isolated record), central and southern provinces of the Sudan Republic across to the Somali Republic, Uganda, Kenya and Tanzania (Map 57).

FLORISTIC CATEGORY Eastern Sudanian and Afriental Domains with an outlier on Jos Plateau, Nigeria.

Note: In the Jebel Marra area the tree does not attain the full vigour and pagoda-branching found in Kordofan.

140 **Terminalia laxiflora** *Engler & Diels* in Engl., Monogr. Afr. Pflanzen. 4:12, t.2B (1900); Broun & Massey, F.S. :110 (1929); Andr., F.P.S. 1:208 (1950); Keay, F.W.T.A. ed. 2, 1:279 (1954); Griffiths in Journ. Linn. Soc. Bot. 55:868, fig. 18 (1959); Sahni, Trees N. Sudan :26, fig. 9 (1968); *Wickens*, F.T.E.A. Combret. :87 (1973).

T. schweinfurthii Engl. & Diels in Engl., Monogr. Afr. Pflanzen. 4:12 (1900); Broun & Massey, F.S. :110 (1929); Andr., F.P.S. 1:210 (1950); Cuf., Enum. :624 (1959).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 700–945 m; savanna, especially riverine. *Francis* 30 & 56; *Wickens* 1544, 1588, 1631 & 2937; *Kassas* 355a & b (KHU & CAI, *n.v.*); *Kamil* 1175. Vernacular name: (Fur) *tabee*; (Arabic) *daroot*.

DISTRIBUTION Sierra Leone to Cameroon and eastwards to the southern provinces of the Sudan Republic (Ethiopia *fide* Cufodontis) and Uganda (Map 58).

FLORISTIC CATEGORY Sudanian Domain.

[*C. microphyllum* sensu *Wickens*, For. Bull. 14(N.S.): :8 (1969), non Klotzsch (1861).]

DARFUR Lowland plain, 790–1020 m; river banks. *Wickens* 1119, 1504, 1609 & 2900. Vernacular name: (Fur) *kujjaj*.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola.

Also found in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Note: For further taxonomic discussion see *Wickens l. c.* (1971).

139 **Guiera senegalensis** *J. F. Gmelin* in Linn., Syst. Nat. ed. 13, 2:675 (1791); Lawson in F.T.A. 2:418 (1871); Broun & Massey, F.S. :112 (1929); Andr., F.P.S. 1:206, fig. 114 (1950); Keay, F.W.T.A. ed. 2, 1:275, fig. 104 (1954); Quétel, Dossier 5:108 (1969).

DARFUR Lowland plain 945–1020 m; degraded savanna. *Lynes* 550; *Francis* 31; *Robertson* 102 & 144. Vernacular name: (Arabic) *ghubeish*.

DISTRIBUTION Senegal to N. Nigeria eastwards to the central provinces of the Sudan Republic to the west of the Nile (Map 56).

FLORISTIC CATEGORY Sahelian Domain.

139 **Terminalia brownii** *Fresen.* in Mus. Senckenb. 2:152, t.9, 1 (1837); Lawson in F.T.A. 2:415 (1871); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :111 (1929); Andr., F.P.S. 1:210, fig. 115 (1950); Griffiths in Journ. Linn. Soc. Bot. 55:893, fig. 26 (1959); Cuf., Enum. :621 (1959); Sahni, Trees N. Sudan :24, fig. 8 (1968); Quétel, Dossier 5:108 (1969); *Wickens*, F.T.E.A. Combret. :90 (1973).

DARFUR Jebel Marra, piedmont and massif, 1000–1830 m; lowland plain, 900 m; savanna, especially riverine. *Lynes* s.n. (BM!); *Francis* 13 & 45; *Wickens* 1625, 1820 & 3007; *Kassas* 221 & 746 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *divia*; (Arabic) *subagh*.

DISTRIBUTION N. Nigeria (isolated record), central and southern provinces of the Sudan Republic across to the Somali Republic, Uganda, Kenya and Tanzania (Map 57).

FLORISTIC CATEGORY Eastern Sudanian and Afriental Domains with an outlier on Jos Plateau, Nigeria.

Note: In the Jebel Marra area the tree does not attain the full vigour and pagoda-branching found in Kordofan.

140 **Terminalia laxiflora** *Engler & Diels* in Engl., Monogr. Afr. Pflanzen. 4:12, t.2B (1900); Broun & Massey, F.S. :110 (1929); Andr., F.P.S. 1:208 (1950); Keay, F.W.T.A. ed. 2, 1:279 (1954); Griffiths in Journ. Linn. Soc. Bot. 55:868, fig. 18 (1959); Sahni, Trees N. Sudan :26, fig. 9 (1968); *Wickens*, F.T.E.A. Combret. :87 (1973).

T. schweinfurthii Engl. & Diels in Engl., Monogr. Afr. Pflanzen. 4:12 (1900); Broun & Massey, F.S. :110 (1929); Andr., F.P.S. 1:210 (1950); Cuf., Enum. :624 (1959).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 700–945 m; savanna, especially riverine. *Francis* 30 & 56; *Wickens* 1544, 1588, 1631 & 2937; *Kassas* 355a & b (KHU & CAI, *n.v.*); *Kamil* 1175. Vernacular name: (Fur) *tabee*; (Arabic) *daroot*.

DISTRIBUTION Sierra Leone to Cameroon and eastwards to the southern provinces of the Sudan Republic (Ethiopia *fide* Cufodontis) and Uganda (Map 58).

FLORISTIC CATEGORY Sudanian Domain.

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

141 **Hypericum perforatum** *L.*, Sp. Pl. :785 (1753); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :116 (1929); Andr., F.P.S. 1:212 (1950); Robson in Kew Bull. 12:434 (1957).

?*H. chrysostictum* Webb, Frag. Fl. Aethiop. :54 (1854); Oliver, F.T.A. 1:157 (1957).

DARFUR Jebel Marra, massif, 1975–2850 m; grassland and arable land. *Lynes* 25a & 25b (BM!); *Macintosh* 121 & 145; *Dandy* 122 & 125 (both BM!); *Drar* s.n.; *Jackson* 3335; *Robertson* 136; *Wickens* 1463, 1688 & 2450. Vernacular name: (Fur) *angub*.

DISTRIBUTION Europe, N. Africa and the Middle East; introduced into the Sudan Republic (Jebel Marra), South Africa (Map 59), and Australia.

FLORISTIC CATEGORY Mediterranean, Central European and Irano-Turanian Regions.

Note: Robson (*l. c.*) suggests that *H. perforatum* is indigenous on Jebel Marra. I suggest that its distribution on the massif points to it having been introduced, possibly as an impurity in seed.

It was originally introduced into S. Africa in 1942 as an impurity in vetch seed and rapidly spread through the SW. Cape (Henderson & Anderson, Bot. Survey S. Afr. Mem. 37:218 (1966)).

Tiliaceae

142 **Corchorus olitorius** L., Sp. Pl. :529 (1753); Masters in F.T.A. 1:262 (1868); Broun & Massey, F.S. :121 (1929); Andr., F.P.S. 1:217 (1950); Keay, F.W.T.A. ed. 2, 1:308 (1958); Cuf., Enum. :515 (1958); Quézel, Dossier 5:108 (1969).

DARFUR Lowland plain, 1020 m; arable land. *Wickens* 1763 & 1795. Vernacular name: (Fur) *balugeh* or *mataling balugeh*; (Arabic) *mulukhia*. Leaves used as a vegetable.

DISTRIBUTION Widely distributed throughout the tropics; cultivated in Asia for its fibres, but usually occurs as a weed of cultivation elsewhere. Widespread in the Sudan, sometimes cultivated.

FLORISTIC CATEGORY Pantropical.

143 **Corchorus trilocularis** L., Syst. Nat. ed. 12, 2:369 (1767); Masters in F.T.A. 1:262 (1868); Broun & Massey, F.S. :122 (1929); Andr., F.P.S. 1:217 (1950); Keay, F.W.T.A. ed. 2, 1:308 (1958); Cuf., Enum. :516 (1958).

DARFUR Jebel Marra, *sine loc.* *Macintosh* 118.

DISTRIBUTION Widely distributed throughout the tropics of the Old World, also in Australia. Widely distributed in the Sudan.

FLORISTIC CATEGORY Palaeotropical.

144 **Grewia bicolor** Juss. in Ann. Mus. Nat. Hist. Nat. Paris 4:90, t.50, fig. 2 (1804); Andr., F.P.S. 1:222 (1950); Keay, F.W.T.A. ed. 2, 1:304 (1958); Quézel, Dossier 5:108 (1969).

[*G. salvifolia* sensu Masters in F.T.A. 1:247 (1868); Broun & Massey, F.S. :118 (1929), *non* L.f. (1781).]

G. bicolor Juss. var. *canescens* (A. Rich.) Burret in Engl., Bot. Jahrb. 45:177 (1910); Cuf., Enum. :519 (1958); Wickens, For. Bull. 14(N.S.) :8 (1969).

DARFUR Jebel Marra, massif, 1780–2200 m; degraded savanna. Jackson 2657 (FHO, *n.v.*); *Wickens* 1425. Vernacular name: (Fur) *seeno* or *simmo*; (Arabic) *basham*. Fruit edible.

DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal; also in Arabia and India. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian-Zambezian Region and ?Sind (insufficient data).

145 **Grewia flavescens** Juss. in Ann. Mus. Nat. Hist. Nat. Paris 4:91 (1804); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :118 (1929); Andr., F.P.S. 1:233 (1950); Keay, F.W.T.A. ed. 2, 1:305 (1958); Cuf., Enum. :520 (1958); Quézel, Dossier 5:108 (1969).

[*G. pilosa* sensu Masters in F.T.A. 1:250 (1868), *pro parte, non* Lam. (1789).]

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna. *Lynes* 81 fide Norman *l. c.*, *n.v.* & 546 (BM!); *Wickens* 1614 & 1868; *Kassas* 271 & 835 (both KHU & CAI, *n.v.*). Vernacular name: (Arabic) *gaddeim*.

DISTRIBUTION Senegal to N. Nigeria and eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Arabia and India. Occurs throughout the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions and ?Sind (insufficient data).

146 **Grewia mollis** Juss. in Ann. Mus. Nat. Hist. Nat. Paris 4:91 (1804); Masters in F.T.A. 1:248 (1868); Broun & Massey, F.S. :118 (1929); Andr., F.P.S. 1:220, fig. 120 (1950); Keay, F.W.T.A. ed. 2, 1:304 (1958); Cuf., Enum. :521 (1958).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna. *Francis* 20; *Wickens* 1556; *Kassas* 797 (KHU & CAI, *n.v.*); *Kamil* 1070. Vernacular name: (Fur) *simmo*; (Arabic) *basham*. Fruit edible.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south to Zambia. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

147 **Grewia tenax** (Forsk.) Fiori in Agric. Colon. 5, Suppl. :23 (1912); Andr., F.P.S. 1:22, fig. 121 (1950); Keay, F.W.T.A. ed. 2, 1:305 (1958); Cuf., Enum. :523 (1958).

Chadara tenax Forsk., Fl. Aegypt.-Arab. :ccxiv, 105 (1775).

Grewia populifolia Vahl, Symb. Bot. 1:33 (1790); Masters in F.T.A. 1:246 (1868); Quézel, Dossier 5:109 (1969).

G. betulifolia Juss. in Ann. Mus. Nat. Hist. Nat. Paris 4:92, t.50, fig. 1 (1804); Broun & Massey, F.S. :119 (1929).

DARFUR Jebel Marra, piedmont, 1130 m; *Acacia mellifera* scrub. *Wickens* 1367. Vernacular name: (Fur) *sabual*, pl. *sabuula*; (Arabic) *gaddeim*. Fruit edible.

DISTRIBUTION Mauritania, Senegal and Niger across to Ethiopia and south through E. Africa to Rhodesia and SW. Africa; also in SW. Arabia. Widespread through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

148 **Grewia villosa** Willd. in Ges. Nat. Fr. Berl. Neue Schr. 4:205 (1803); Masters in F.T.A. 1:249 (1868); Broun & Massey, F.S. :119 (1929); Andr., F.P.S. 1:220, fig. 120 (1950); Keay, F.W.T.A. ed. 2, 1:304 (1958); Cuf., Enum. :525 (1958); Quézel, Dossier 5:108 (1969).

DARFUR Jebel Marra, piedmont, foothills and massif, 1160–1900 m; lowland plain, 1100 m; savanna and fallow lands. *Lynes* 547; *Dandy* 52 (BM!); *Francis* 41; *Wickens* 1382 & 1810; *Kassas* 732 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *simmo*; (Arabic) *tukko*. Fruit edible.

DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south to Rhodesia and Botswana; also in Cape Verde Is., SW. Arabia and India. Widespread in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions and ?Sind (insufficient data).

149 **Triumfetta annua** L., Mant. Pl. 1:73 (1767); Masters in F.T.A. 1:256 (1868); Broun & Massey, F.S. :120 (1929); Andr., F.P.S. 1:227 (1950); Cuf., Enum. :526 (1958).

DARFUR Jebel Marra, piedmont and massif, 1160–1375 m; lowland plain, 1020 m; savanna and fallow lands. *Lynes* 545; *Wickens* 2510 & 2556.

DISTRIBUTION Sudan Republic (Jebel Marra and the Red Sea Hills) and Ethiopia southwards to the Transvaal and SW. Africa; also in Madagascar, India, Malaya and China.

FLORISTIC CATEGORY Palaeotropical.

150 **Triumfetta pentandra** A. Rich. in Guill. & Perr., Fl. Seneg. 1:93, t.19 (1831); Masters in F.T.A. 1:255 (1868); Broun & Massey, F.S. :120 (1929); Andr., F.P.S. 1:227 (1950); Keay, F.W.T.A. ed. 2, 1:309 (1958); Cuf., Enum. :528 (1958); Quézel, Dossier, 5:109 (1969).

DARFUR Jebel Marra, massif, 1310 m; lowland plain, 1020 m; rock crevices. *Wickens* 2356 & 2539.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Arabia, India and Formosa. Widely distributed in central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical weed.

151 **Triumfetta rhomboidea** Jacq., Enum. Pl. Carib. :22 (1760); Masters in F.T.A. 1:257 (1868); Broun & Massey, F.S. :120 (1929); Andr., F.P.S. 1:227 (1950); Keay, F.W.T.A. ed. 2, 1:309 (1958); Cuf., Enum. :529 (1958).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna, particularly riverine. *Dandy* 59 (BM!); *Wickens* 1418, 1869 & 2862; *Kassas* 810 & 853 (both KHU & CAI, *n.v.*); *Kamil* 1091. Vernacular name: (Fur) *ngarri*.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and southwards to the Cape; widely distributed throughout the tropics and subtropics generally. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

152 **Triumfetta trichocarpa** Hochst. ex A. Rich., Tent. Fl. Abyss. 1:84 (1847); Masters in F.T.A. 1:259 (1868); Cuf., Enum. :530 (1958); Wickens, For. Bull. 14(N.S.) :8 (1969).

DARFUR Lowland plain, 1130 m; rock crevices (Jebel Sirmi); *Wickens* 2327.

DISTRIBUTION Sudan Republic (Darfur) and Ethiopia southwards through E. Africa to Zambia and Mozambique.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

Sterculiaceae

153 **Dombeya quinqueseta** (Del.) Exell in Journ. Bot. 73: 263 (1935); Andr., F.P.S. 2:2, fig. 1 (1952); Cuf., Enum. :581 (1959).

Xeropetalum quinqueseta Del., Cent. Pl. Méroé :84 (1826).

var. **quinqueseta**; Keay, F.W.T.A. ed. 2, 1:317 (1958).

Dombeya reticulata Masters in F.T.A. 1:228 (1868).

D. multiflora (Endl.) Planchon var. *vestita* K. Schum. in Engl., Monogr. Afr. Stercul. :34 (1900); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :122 (1929).

DARFUR Jebel Marra, piedmont and massif 1160–1980 m; lowland plain, 945 m; savanna. *Lynes* 107 (BM!); *Macintosh* 33; *Robertson* 100; *Wickens* 977 & 2860; *Kassas* 764 (KHU & CAI, *n.v.*); *Kamil* 1082. Fruit edible.

DISTRIBUTION N. Nigeria (Jos. Plateau), Sudan Republic and Ethiopia, Uganda and Kenya (Map 60). Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domain.

154 **Hermannia tigreensis** Hochst. ex A. Rich., Tent. Fl. Abyss. 1:74, t.17 (1847); Masters in F.T.A. 1:233 (1868); Broun & Massey, F.S. :123 (1929); Andr., F.P.S. 2:5 (1952); Keay, F.W.T.A. ed. 2, 1:318 (1958); Cuf., Enum. :583 (1959).

DARFUR Jebel Marra, piedmont and massif, 1160–7780 m; arable weed. *Macintosh* 143; *Wickens* 2112 & 2182.

DISTRIBUTION Scattered occurrences from Senegal to N. Nigeria eastwards to Ethiopia and south to Mozambique, Rhodesia and Angola. Widely distributed through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region, weed.

155 **Sterculia setigera** Del., Cent. Pl. Méroé :61 (1826); Andr., F.P.S. 2:7, fig. 2 (1952); Keay, F.W.T.A. ed. 2, 1:320 (1958); Cuf., Enum. :586 (1959); Sahni, Trees N. Sudan :28, fig. 10 (1968); Quézel, Dossier 5:109 (1969).

S. tomentosa Guill. & Perr., Fl. Seneg. 1:81, t.16 (1831); Masters in F.T.A. 1:217 (1868); Broun & Massey, F.S. :123 (1929). *S. cinerea* A. Rich., Tent. Fl. Abyss. 1:74, t.16 (1847); Masters in F.T.A. 1:218 (1868); Broun & Massey, F.S. :123 (1929).

DARFUR Jebel Marra, massif, 1350 m; lowland plain, 750–850 m; savanna. *Wickens* 1606 & 2927 (the fruits are required in order to confirm both these records); *Kamil* 1200. Vernacular name: (Fur) *guldubaar*; (Arabic) *umm tali*.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, and in Uganda, Tanzania and Angola (Map 61). Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

156 **Waltheria indica** L., Sp. Pl. 2:673 (1753); Andr., F.P.S. 2:8 (1952); Keay, F.W.T.A. ed. 2, 1:319 (1958); Cuf., Enum. :583 (1959).

W. americana L., Sp. Pl. 2:673 (1753); Masters in F.T.A. 1:235 (1868); Broun & Massey, F.S. :123 (1929).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020–1100 m; arable lands and waste places. *Lynes* 543; *Wickens* 1126 & 1867. Vernacular name: (Fur) *heeganar*; (Arabic) *irg en nahal*.

DISTRIBUTION Widely distributed through the tropics and subtropics of the world. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

Bombacaceae

157 **Adansonia digitata** L., Sp. Pl. 2:1190 (1753); Masters in F.T.A. 1:212 (1868); Broun & Massey, F.S. :124 (1929); Andr., F.P.S. 2:10, fig. 3 (1952); Keay, F.W.T.A. ed. 2, 1:334 (1958); Cuf., Enum. :575 (1959); Sahni, Trees N. Sudan :30, fig. 11 (1968).

DARFUR Jebel Marra, foothills, below Suni, in the Wadi Jawa valley, 1250 m; lowland plain, Melemm, Dodo, Wadi Lailonga and Zalingei, 900–1150 m; stream banks. No specimens collected and no further records observed within the area surveyed.

Vernacular name: (Fur) *maada*; (Arabic) *tebeli*. Bark used as cordage; young leaves eaten as a vegetable, seeds and pulp also edible.

DISTRIBUTION Guinée Republic to Nigeria eastwards through the northern and central provinces of the Sudan Republic to Ethiopia and south to the Transvaal and SW. Africa (Map—see Lucas in Mitt. Bot. Staatsamml. München 10:163 (1971); introduced into India.

FLORISTIC CATEGORY Sudano-Zambeian Region.

158 **Ceiba pentandra** (L.) Gaertn., Fruct. 2:244, t.133 (1791); Broun & Massey, F.S. :124 (1929); Andr., F.P.S. 2:10 (1952); Keay, F.W.T.A. ed. 2, 1:335 (1958); Cuf., Enum. :576 (1959).

Bombax pentandrum L., Sp. Pl. :511 (1753).

Eriodendron anfractuosum DC., Prodr. 1:479 (1824); Masters F.T.A. 1:214 (1868), *nom. illegit.*

DARFUR Lowland plain, 945 m; rare tree; *Acacia albida* woodland. *Wickens* 1116. Also solitary tree observed at Suni, but not collected. Vernacular name: (Fur) *arairing kurroh*.

DISTRIBUTION Gambia to Cameroon and eastwards to Ethiopia and south to Malawi, Zambia and Angola; widely cultivated throughout the tropics for the kapok fibre of commerce; believed to be native in tropical America, tropical Africa and India (*vide* Wild in Fl. Zambesiaca 1:517 (1961). Widely scattered in central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

Malvaceae

159 **Abutilon angulatum** (Guill. & Perr.) Masters in F.T.A. 1:183 (1868); Broun & Massey, F.S. :126 (1929); Andr., F.P.S. 2:12 (1952); Keay, F.W.T.A. ed. 2, 1:337 (1958); Cuf., Enum. :534 (1959); Quézel, Dossier 5:110 (1969).

Bastardia angulata Guill. & Perr., Fl. Seneg. :65 (1831).

Abutilon intermedium Hochst. ex Schweinf., Beitr. Fl. Aethiop. :49 (1867).

DARFUR Jebel Marra, massif, 1780 m; *Kassas* 806 (KHU & CAI!). DISTRIBUTION Senegal to Nigeria and eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

160 *Azanza garckeana* (F. Hoffm.) Exell & Hillcoat in Contrib. Conhec. Fl. Moçamb. 2:59 (1954); Keay, F.W.T.A. ed. 2, 1:342 (1958); Wickens, For. Bull. 14(N.S.) :9 (1969).

Thespesia garckeana F. Hoffm., Beitr. Fl. Centr. Ost-Afr. :12 (1889); Broun & Massey, F.S. :133 (1929); Andr., F.P.S. 2:42, fig. 18 (1952).

[*T. lampas* sensu Masters in F.T.A. 1:209 (1868), *non* Benth. & Hook.f. (1862).]

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; savanna and old fallow lands. Forms dense thickets from suckers on abandoned cultivation around Suni, etc. *Macintosh* 69; *Robertson* 21; *Francis* 7; *Wickens* 2809; *Kassas* 142 & 156 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *mera* or *meran kuruh*; (Arabic) *gukh gukh, jak jak* or *jug jug*. The fruit is edible, a sweet syrup is made from the boiled fruits.

DISTRIBUTION N. Nigeria (possibly introduced), Sudan Republic, Kenya and Tanzania southwards to Rhodesia and SW. Africa (Map 62). Also found in the Sudan in the Nuba Mountains; sometimes grown as an ornamental, as in the streets of Zalingei.

FLORISTIC CATEGORY Sudano-Zambezian Region.

161 *Hibiscus articulatus* Hochst. ex A. Rich., Tent. Fl. Abyss. 1:60 (1847); Masters in F.T.A. 1:200 (1868); Broun & Massey F.S. :130 (1929); Andr., F.P.S. 2:26 (1952); Keay, F.W.T.A. ed. 2, 1:347 (1958); Cuf., Enum. :556 (1959).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 900 m; *Acacia seyal* savanna. *Wickens* 2030 & 2214.

DISTRIBUTION Ivory Coast and N. Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and Angola. Widely distributed in the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

162 *Hibiscus cannabinus* L., Syst. Nat. ed. 10, 2:1149 (1759); Masters in F.T.A. 1:204 (1868); Broun & Massey, F.S. :132 (1929); Andr., F.P.S. 2:28, fig. 11 (1952); Keay, F.W.T.A. ed. 2, 1:347 (1958); Cuf., Enum. :558 (1959); Quézel, Dossier 5:110 (1969).

DARFUR Jebel Marra, massif, 1200–2050 m; lowland plain, 1000–1020 m. *Dandy* 140 (BM!); *Robertson* 39; *Pettet* J.167; *Wickens* 1749, 2576 & 2770; *Kassas* 303 (KHU & CAI!). Vernacular name: (Fur) *juu* or *zuwo*; (Arabic) *kirkaj*. Stem fibres used for cordage.

DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic and south to Natal, Transvaal and SW. Africa; widely distributed through the tropics. Widely distributed in the Sudan, occurs both wild and under cultivation.

FLORISTIC CATEGORY Pantropical.

163 *Hibiscus lobatus* (Murray) Kuntze, Rev. Gen. Pl. 3(2):19 (1898); Andr., F.P.S. 2:31 (1952); Keay, F.W.T.A. ed. 2, 1:346 (1958); Cuf., Enum. :563 (1959).

Solandra lobata Murray in Comment. Soc. Reg. Sci. Gotting. 6:20, t.1 (1785).

Hibiscus solandra L'Hérit., Stirp. Nov. 1:103, t.49 (1788); Masters in F.T.A. 1:206 (1868); Broun & Massey, F.S. :132 (1929), *nom. illegit.*

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1050 m; fallow lands and scree slopes. *Wickens* 2180 & 2326.

DISTRIBUTION Scattered occurrences from Senegal to the Cameroon and eastwards to the central provinces of the Sudan Republic and south through E. Africa to Mozambique and Rhodesia; also in Madagascar, India and Malaya.

FLORISTIC CATEGORY Palaeotropical.

164 *Hibiscus micranthus* L.f., Suppl. Pl. :308 (1781); Masters in F.T.A. 1:205 (1868); Broun & Massey, F.S. :132 (1929); Andr., F.P.S. 2:28 (1952); Keay, F.W.T.A. ed. 2, 1:346 (1958); Cuf., Enum. :564 (1959); Quézel Dossier 5:110 (1969).

DARFUR Jebel Marra, 1800–1900 m; lowland plain, 850 m; savanna. *Wickens* 1643, 1849 & 2612; *Kassas* 444 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Togo eastwards to the Somali Republic and from Tanzania southwards to the Transvaal; also in Arabia and India. Widely distributed in the central provinces of the Sudan and in the Red Sea Hills.

FLORISTIC CATEGORY Sudanian and Zambezian Domains and Deccan Region.

165 *Hibiscus sidiformis* Baillon in Bull. Soc. Linn. Paris 1:518 (1885) (as '*sidaeformis*'); Keay, F.W.T.A. ed. 2, 1:346 (1958); Cuf., Enum. :567 (1959); Wickens, For. Bull. 14(N.S.) :9 (1969).

H. ternatus (Cav.) Masters in F.T.A. 1:206 (1868); Broun & Massey, F.S. 132 (1929).

H. ternifoliolus F. W. Andr., F.P.S. 2:31 (1952); Quézel, Dossier 5:110 (1969).

DARFUR Lowland plains, 1020 m; savanna. *Wickens* 2338.

DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Madagascar. Widely distributed through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

166 *Malva verticillata* L., Sp. Pl. 2:689 (1753); Masters in F.T.A. 1:177 (1868); Broun & Massey, F.S. :125 (1929); Andr., F.P.S. 2:33 (1952); Cuf., Enum. :541 (1959).

DARFUR Jebel Marra, massif, 1900–2650 m; lowland plain 1100 m; arable weed. *Lynes* 540 (BM!); *Wickens* 1683, 2657 & 2979; *Kassas* 442, 497 & 620 (all KHU & CAI, *n.v.*). Sole records known for the Sudan. Vernacular name: (Arabic) *kugnu*. The leaves are eaten as a vegetable.

DISTRIBUTION A native of Asia but introduced as a weed of cultivation to many parts of the world; in Africa occurs from Egypt southwards to E. Africa and also known in the Transvaal. FLORISTIC CATEGORY Subcosmopolitan weed.

167 *Pavonia hirsuta* Guill. & Perr., Fl. Seneg. 1:51 (1831); Masters in F.T.A. 1:191 (1868); Broun & Massey, F.S. :128 (1929); Andr., F.P.S. 2:36, fig. 14 (1952); Keay, F.W.T.A. ed. 2, 1:341, fig. 123 (1958).

DARFUR Lowland plain, 1100 m. *Lynes* 538.

DISTRIBUTION Senegal to N. Nigeria eastwards to the central provinces of the Sudan and south through E. Africa to Mozambique, Rhodesia and SW. Africa.

FLORISTIC CATEGORY Sudano-Zambezian Region.

168 *Pavonia patens* (Andr.) Chiov. in Ann. Bot. Roma 13:409 (1915); Andr., F.P.S. 2:34 (1952); Cuf., Enum. :549 (1959). *Sida patens* Andr., Bot. Rep. 9, t.571 (1809).

Pavonia macrophylla E. Mey. ex Harvey in Harvey & Sonder, Fl. Cap. 1:169 (1860); Masters in F.T.A. 1:190 (1868), *nom. illegit.*

P. glechomifolia (A. Rich.) Garcke in Peters, Reise Mossamb. Bot. 1:123 (1861); Masters in F.T.A. 1:190 (1868); Broun & Massey, F.S. :128 (1929).

P. burchellii (DC.) R. A. Dyer in Bull. Misc. Inf. Kew 1932:152 (1932).

DARFUR Jebel Marra, piedmont and massif, 1160–2050 m; lowland plain, 900–1100 m; savanna. *Lynes* 541; *Macintosh* 120; *Dandy* 141 (BM!); *Aglen* 5; *Wickens* 1375, 1393 & 1858; *Kassas* 162 & 256 (both KHU & CAI!). Vernacular name: (Fur) *tign tignya*; (Arabic) *haneil*.

DISTRIBUTION Sudan Republic (Darfur, Red Sea Hills and Didinga Hills) to the Somali Republic and south to Natal, Transvaal and SW. Africa.

FLORISTIC CATEGORY Afriental and Zambezian Domains.

169 **Sida alba** L., Sp. Pl., ed. 2, 2:960 (1763); Andr., F.P.S. 2:41, fig. 17 (1952); Keay, F.W.T.A. ed. 2, 1:339 (1958); Quétel, Dossier 5:111 (1969).

S. spinosa L. Sp. Pl. 2:683 (1753); Masters in F.T.A. 1:180 (1868); Broun & Massey, F.S. 1:25 (1929); Cuf., Enum. 544 (1959), pro parte.

DARFUR Jebel Marra, foothills and massif, 1350–1400 m; lowland plain, 1020–1100 m; arable lands. *Lynes* 516a; *Wickens* 1341 & 2999; *Kassas* 194, 440 & 791 (all KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and SW. Africa; widespread through the tropics. Widespread through the Sudan.

FLORISTIC CATEGORY Pantropical.

170 **Sida ovata** Forsk., Fl. Aegypt.-Arab. :cxvi, 124 (1775); Andr., F.P.S. 2:41 (1952); Keay, F.W.T.A. ed. 2, 1:339 (1958); Cuf., Enum. 543 (1959); Quétel, Dossier 5:111 (1969).

S. greviioides Guill. & Perr. Fl. Seneg. 1:71 (1831); Masters in F.T.A. 1:182 (1868); Broun & Massey, F.S. 1:26 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; lowland plain, 1020–1100 m. *Lynes* 542; *Wickens* 1123, 2048 & 2254; *Kassas* 349 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *sargeh sargeh*.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Arabia and Socotra. Widespread through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

171 **Sida rhombifolia** L., Sp. Pl. 2:684 (1753); Masters in F.T.A. 1:181 (1868); Broun & Massey, F.S. 1:26 (1929); Andr., F.P.S. 2:41 (1952); Keay, F.W.T.A. ed. 2, 1:339 (1958); Cuf., Enum. 544 (1959).

DARFUR Jebel Marra, piedmont and massif, 1160–1765 m; lowland plain, 1100 m; arable lands and waste places. *Lynes* 516b; *Wickens* 1576 & 2266; *Kassas* 302 & 367 (both KHU & CAI!).

DISTRIBUTION Guinée Republic to Nigeria eastwards to Ethiopia and south through E. Africa to Mozambique and Rhodesia; widely distributed through the tropics. Widely distributed through central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

172 **Sida urens** L., Syst. Nat. ed. 10, 2:1145 (1759); Masters in F.T.A. 1:179 (1868); Broun & Massey, F.S. 1:25 (1929); Andr., F.P.S. 2:41 (1952); Keay, F.W.T.A. ed. 2, 1:339 (1958); Cuf., Enum. 545 (1959).

DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1342.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Mozambique and Rhodesia; widely distributed through the tropics. Found in the southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

173 **Wissadula rostrata** (Schumacher) Hook.f. in Hook., Niger Fl. :229 (1840); Masters in F.T.A. 1:182 (1868); Broun & Massey, F.S. 1:26 (1929).

Sida rostrata Schumacher in Kongel. Dansk. Vidensk. Selsk. Naturvid. Math. Afh. 4:80 (1829).

Wissadula periplocoifolia (L.) Presl ex Thwaites, Enum. Pl. Zeyl. :27 (1858); Cuf., Enum. 540 (1959).

W. amplissima (L.) R. E. Fries var. *rostrata* (Schumach.) R. E. Fries in Kungl. Svenska Vetenska-Akad. Handl. 43(4):51 t.6, fig. 13–14 (1908); Andr., F.P.S. 2:43 (1952); Keay, F.W.T.A. ed. 2, 1:336 (1958).

DARFUR Jebel Marra, massif, 1340 m; lowland plain, 1020–1100 m; fallow lands. *Lynes* 512; *Wickens* 2743 & 2830; *Kassas* 134 & 161 (both KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa. Widely distributed in the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Euphorbiaceae

174 **Acalypha ciliata** Forsk., Fl. Aegypt.-Arab. :162 (1775); Hutch. in F.T.A. 6(1):901 (1912); Broun & Massey, F.S. 1:53 (1929); Andr., F.P.S. 2:51 (1952); Cuf., Enum. 424 (1956); Keay, F.W.T.A. ed. 2, 1:410 (1958); Quétel, Dossier 5:111 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–c. 1700 m; lowland plain, 1160 m; shady places. *Aglen* 17; *Wickens* 2192 & 2286.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in India. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

175 **Acalypha crenata** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:246 (1851); Hutch. in F.T.A. 6(1):903 (1912); Broun & Massey, F.S. 1:54 (1929); Andr., F.P.S. 2:52 (1952); Keay, F.W.T.A. ed. 2, 1:410 (1958).

DARFUR Jebel Marra, massif, 1780 m. *Kassas* 747 (KHU & CAI!).

DISTRIBUTION N. Nigeria, Cameroon and eastwards to the Somali Republic and Uganda. Found in the central provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

176 **Acalypha segetalis** Muell. Arg. in Journ. Bot. 1864:336 (1864); Hutch. in F.T.A. 6(1):904 (1912); Keay, F.W.T.A. ed. 2, 1:410 (1958).

DARFUR Jebel Marra, piedmont, 1160 m; fallow lands. *Wickens* 2111 & 2178. Sole records seen for the Sudan.

DISTRIBUTION Senegal to Cameroon and eastwards to the Sudan (Darfur), also from Mozambique to Natal westwards to Angola and SW. Africa.

FLORISTIC CATEGORY Sudanian and Zambezian Domains.

177 **Acalypha villicaulis** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:248 (1851); Hutch. in F.T.A. 6(1):893 (1912); Broun & Massey, F.S. 1:52 (1929); Andr., F.P.S. 2:50 (1952); Cuf., Enum. 427 (1956).

A. senensis Klotzsch in Peters, Reise Mossamb. Bot. :96 (1862); Hutch. in F.T.A. 6(1):888 (1912); Broun & Massey, F.S. 1:52 (1929); Andr., F.P.S. 2:50 (1952); Keay, F.W.T.A. ed. 2, 1:409 (1958), **synon. nov.**

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1100–1280 m; savanna. *Lynes* 600; *Macintosh* 126; *Wickens* 1949 & 1965A.

DISTRIBUTION Senegal to Cameroon eastwards to the Sudan (Ethiopia *vide* Cufodontis) and south through E. Africa to Natal, the Transvaal and SW. Africa. Also occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Note: *Acalypha senensis* was originally separated from *A. villicaulis* because of the presence of gland-tipped hairs on the ovary. The variability in the density of these hairs is such that it is not possible to keep the two species separate.

178 **Andrachne aspera** Sprengel, Syst. Veg. 3:884 (1826); Hutch. in F.T.A. 6(1):633 (1912); Broun & Massey, F.S. 1:42 (1929); Andr., F.P.S. 2:55 (1952); Cuf., Enum. 412 (1956); Quétel, Dossier 5:112 (1969).

A. aspera Spreng. var. *glandulosa* Hochst. ex A. Rich. Tent. Fl. Abyss. 2:254 (1851), **synon. nov.**

DARFUR Jebel Marra, massif, 1525–1900 m; arable weed. *Wickens* 2867 & 2995; *Kassas* 218, 438 & 794 (all KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra, Nuba Mountains and Red Sea Hills) and Ethiopia (Map 63); also in Morocco, Arabia, Iran and India.

FLORISTIC CATEGORY Afrioriental Domain and Saharo-Sindian Region.

Note: The densely glandular pubescent Jebel Marra plants were first referred to var. *glandulosa* from Ethiopia. An examination of the species throughout its distribution range showed such a range of variation in the density of the glandular hairs that it is impossible to separate var. *glandulosa* from the eglandular, pubescent to glabrescent var. *aspera*.

179 ***Bridelia ndellensis*** Beille in Bull. Soc. Bot. Fr. 55, Mém. 8:69 (1908); Keay, F.W.T.A. ed. 2, 1:371 (1958); Wickens, For. Bull. 14(N.S.):9 (1969).

B. ferruginea Benth. var. *orientalis* Hutch. in F.T.A. 6(1):620 (1921). Broun & Massey, F.S. :141 (1929).

[*B. aubrevillei* sensu Andr., F.P.S. 2:56, (1952), non Pellegr. (1932).]

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; riverine and gallery forest. *Wickens* 1550 & 1947; *Kamil* 1161.

DISTRIBUTION Dahomey, S. Nigeria, Congo and the southern provinces of the Sudan Republic and Uganda (Map 64).

FLORISTIC CATEGORY Sudanian Domain with Congo extensions.

180 ***Bridelia ndellensis*** Beille x *micrantha* (Hochst.) Baillon

DARFUR Jebel Marra, massif. 1350 m; stream bank. *Kamil* 1160. Leaf shape that of *B. micrantha* and indumentum of *B. ndellensis*.

181 ***Bridelia scleroneura*** Muell.-Arg. in Flora 47:515 (1864); Hutch. in F.T.A. 6(1):614 (1912); Keay, F.W.T.A. ed. 2, 1:370 (1958); Wickens, For. Bull. 14(N.S.):9 (1969).

B. scleroneuroides Pax in Engl., Bot. Jahrb. 15:539 (1893); Hutch. in F.T.A. 6(1):614 (1912); Broun & Massey, F.S. :141 (1929); Andr., F.P.S. 2:56 (1952).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 945 m; savanna. *Francis* 54; *Robertson* 104; *Wickens* 2211.

DISTRIBUTION Senegal to Cameroon, eastwards to Ethiopia and south to Tanzania. Also occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Oriental Domains.

182 ***Croton lobatus*** L., Sp. Pl. :1005 (1753); Hutch. in F.T.A. 6(1):750 (1912); Broun & Massey, F.S. :146 (1929); Andr., F.P.S. 2:60 (1952); Cuf., Enum. :419 (1956); Keay, F.W.T.A. ed. 2, 1:394 (1958); Quézel, Dossier 5:111 (1969).

DARFUR Lowland plain, 1100 m; old fallow. *Wickens* 2058.

DISTRIBUTION Senegal to Cameroon, eastwards to Ethiopia; also in Arabia and S. America. Widely distributed through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudanian, Afrioriental and South Arabian Domains and Neotropics.

183 ***Euphorbia candelabrum*** Trém. ex Kotschy in Mittheil. Geogr. Ges. Wien, 1, Abh. :169 (1857); N. E. Brown in F.T.A. 6(1):598 (1912); Broun & Massey, F.S. :141 (1929); Andr., F.P.S. 2:66 (1952); Cuf., Enum. :444 (1958); Quézel, Dossier 5:111 (1969).

E. murieli N. E. Brown in F.T.A. 6(1):589 (1912); Broun & Massey, F.S. :140 (1929).

E. calycina N. E. Brown in F.T.A. 6(1):597 (1912); Broun & Massey, F.S. :140 (1929).

DARFUR Jebel Marra, massif, 1200–1780 m; savanna. *Wickens* 2815; *Kassas* 569 & 787 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *dullong*; (Arabic) *shagar el sim*. Latex used as a fish and arrow poison.

DISTRIBUTION Central and southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to the Transvaal and Natal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

184 ***Euphorbia heterophylla*** L., Sp. Pl. :453 (1753); Andr., F.P.S. 2:76 (1952); Keay, F.W.T.A. ed. 2, 1:421 (1958).

E. geniculata Ortega, Hort. Matr. Dec. :18 (1797).

DARFUR Jebel Marra, massif, 1780 m; lowland plain 1020 m; arable weed. *Wickens* 1385, 1788 & 2708; *Kassas* 832b & 884 (both KHU & CAI!). Vernacular name: (Fur & Arabic) *umm al laban*.

DISTRIBUTION Senegal to Cameroon and eastwards to the central and southern provinces of the Sudan and south through E. Africa to Mozambique, Rhodesia and Angola; a native of tropical and sub-tropical America now widespread in the tropics.

FLORISTIC CATEGORY Pantropical weed.

185 ***Euphorbia hirta*** L., Sp. Pl. :454 (1753); N. E. Brown in

F.T.A. 6(1):496 (1911); Broun & Massey, F.S. :134 (1929);

Andr., F.P.S. 2:71 (1952); Keay, F.W.T.A. ed. 2, 1:419 (1958).

DARFUR Jebel Marra, massif, 1780 m. *Kassas* 864 (KHU & CAI!).

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and south through E. Africa to the Transvaal; widely distributed through the tropics and subtropics. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

186 ***Euphorbia nubica*** N. E. Brown in F.T.A. 6(1):554 (1911); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :138 (1929); Andr., F.P.S. 2:68, fig. 25 (1952); Cuf., Enum. :453 (1958); Quézel, Dossier 5:112 (1969).

DARFUR Jebel Marra, massif, 1450–2290 m; grassland. *Lynes* 160 (BM!); *Wickens* 1491 & 3002.

arable weed. *Wickens* 2034; *Kassas* 150 & 219 (both KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra and Jebel ed Dair), Ethiopia, Somali Republic and Kenya (Map 65).

FLORISTIC CATEGORY Afrioriental Domain.

187 ***Euphorbia polycnemoides*** Hochst. ex Boiss. in DC., Prodr. 15(2):46 (1862); N. E. Brown in F.T.A. 6(1):506 (1911); Broun & Massey, F.S. :135 (1929); Andr., F.P.S. 2:71 (1952); Keay, F.W.T.A. ed. 2, 1:421, fig. 139A (1958); Cuf., Enum. :455 (1958); Quézel, Dossier 5:112 (1969).

DARFUR Jebel Marra, massif, 1350 m; lowland plain, 1280 m; arable weed. *Wickens* 2034; *Kassas* 150 & 219 (both KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, also Tanzania, Mozambique and Rhodesia; in Arabia (*vide* Cufodontis). Widespread through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

188 ***Euphorbia prostrata*** Aiton, Hort. Kew. ed. 1, 2:139 (1789); N. E. Brown in F.T.A. 6(1):510 (1911); Broun & Massey, F.S. :136 (1929); Keay, F.W.T.A. ed. 2, 1:421, fig. 139C & D (1958); Cuf., Enum. :455 (1958); Wickens, For. Bull. 14(N.S.):9 (1969).

DARFUR Lowland plain, 1010 m; arable weed. *Wickens* 1794.

DISTRIBUTION Senegal to the Gabon and eastwards to the Sudan (Ethiopia *vide* Cufodontis) and southwards to the Cape; a native of tropical America, now widespread as a weed in the tropics.

The only other specimens seen for the Sudan are from Khartoum.

FLORISTIC CATEGORY Pantropical weed.

189 ***Hymenocardia acida*** Tul. in Ann. Sci. Nat. Paris III, 15:256 (1851); Hutch. in F.T.A. 6(1):651 (1912); Broun & Massey, F.S. :143 (1929); Andr., F.P.S. 2:80, fig. 30 (1952); Keay, F.W.T.A. ed. 2, 1:377, fig. 132 (1958).

DARFUR Lowland plain, 900 m; savanna. *Wickens* 1623 & 1624. Vernacular name: (Arabic) *umm khireibeish*.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, south through E. Africa to Mozambique, Rhodesia and Angola. Rare in the central provinces of the Sudan, widely distributed in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian Region.

190 ***Jatropha curcas*** L., Sp. Pl. :1006 (1753); Hutch. in F.T.A. 6(1):791 (1912); Broun & Massey, F.S. :148 (1929); Andr., F.P.S. 2:45 (1952); Cuf., Enum. :432 (1956); Keay, F.W.T.A. ed. 2, 1:397 (1958).

DARFUR Lowland plain, 1020 m; waste places. *Wickens* :755.

Vernacular name: (Fur) *tabaldia*; (Arabic) *tabaldi*.

DISTRIBUTION Senegal eastwards to Ethiopia and southwards to Natal and the Transvaal. An American plant, widely distributed through the tropics. Widely distributed in central and northern provinces of the Sudan, frequently cultivated as a hedgeplant. FLORISTIC CATEGORY Pantropical.

191 **Micrococca mercurialis** (L.) Benth. in Hook., Niger Fl. :503 (1849); Hutch. in F.T.A. 6(1) :878 (1912); Broun & Massey, F.S. :151 (1929); Andr., F.P.S. 2:86 (1952); Cuf., Enum. :423 (1956); Keay, F.W.T.A. ed. 2, :402 (1958).

Tragia mercurialis L., Sp. Pl. :980 (1753).

DARFUR Lowland plain, 1050 m; rock crevices. *Wickens* 2061.

DISTRIBUTION Senegal to Cameroon and eastwards to the southern provinces of the Sudan Republic (Ethiopia *fide* Cufodontis) and south through E. Africa to Rhodesia, Botswana and Angola; also in Madagascar and tropical Asia.

FLORISTIC CATEGORY Palaeotropical.

192 **Phyllanthus reticulatus** Poir., Encycl. Bot. 5:298 (1804); Hutch. in F.T.A. 6(1):700 (1912); Broun & Massey, F.S. :143 (1929); Andr., F.P.S. 2:89 (1952); Cuf., Enum. :415 (1956); Keay, F.W.T.A. ed. 2, 1:387 (1958).

DARFUR Jebel Marra, massif, 1780 m; lowland plain, 700–900 m; river banks. *Francis* 36; *Wickens* 1637 & 2020; *Kassas* 818 (KHU & CAI, *n.v.*).

DISTRIBUTION Sierra Leone to Cameroon and eastwards to the Somali Republic, south through E. Africa to Natal, the Transvaal and SW. Africa; also in Madagascar, southern Asia and Australia. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Palaeotropical.

193 **Ricinus communis** L., Sp. Pl. :1007 (1753); Hutch. in F.T.A. 6(1):945 (1912); Broun & Massey, F.S. :156 (1929); Andr., F.P.S. 2:96 (1952); Cuf., Enum. :430 (1956); Keay, F.W.T.A. ed. 2, 1:410 (1958); Quézel, Dossier 5:113 (1969).

DARFUR Semi-naturalized along the stream banks at Nyertete, etc. No specimens collected. Vernacular name: (Fur) *kowreh*; (Arabic) *kheirua*. An oil extracted from the roasted seed is used for treating skin diseases of camels. The plant is poisonous to stock.

DISTRIBUTION Widespread throughout the tropics and sub-tropics and even into southern Europe. Often cultivated. Cultivated and semi-naturalized in both the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

194 **Securinega virosa** (Roxb. ex Willd.) Baillon in Adansonia 6:334 (1866); Andr., F.P.S. 2:97, fig. 38 (1952); Cuf., Enum. :413 (1956).

Phyllanthus virosus Roxb. ex Willd., Sp. Pl. 4:578 (1805).

Fluggea microcarpa Blume, Bijdr. :580 (1826); Hutch. in F.T.A. 6(1):736 (1912); Broun & Massey, F.S. :146 (1929).

F. virosa (Roxb. ex Willd.) Baillon, Étude Gen. Euphorb. :593 (1858); Quézel, Dossier 5:112 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna. *Wickens* 1426, 1903 & 1904; *Kassas* 893 (KHU & CAI!). Vernacular name: (Fur) *sigrigna*; (Arabic) *alali*. Browsed by camels.

DISTRIBUTION Senegal to Nigeria and eastwards to the Somali Republic and south through E. Africa to Natal, the Transvaal and SW. Africa; also the Mascarene Is., tropical and subtropical Asia and Australia. Widely distributed in the southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

Rosaceae

195 **Rubus niveus** Thunb., Dissert. Rubi :9 (1813); Graham, F.T.E.A. Rosaceae :40 (1960); Wickens, For. Bull. 14(N.S.) :10 (1969).

DARFUR Jebel Marra, massif, 1780 m; river bank, a garden escape. *Wickens* 1479; *Kassas* 739 (KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra), Kenya and Tanzania. An Indian and Malayan bramble introduced into E. Africa for its fruit.

FLORISTIC CATEGORY Deccan and SE. Asia-Malayan Regions.

Leguminosae— Caesalpinioideae

196 **Bauhinia rufescens** Lam., Encyl. Bot. 1:391 (1785); Oliver, F.T.A. 2:289 (1871); Broun & Massey, F.S. :163 (1929); Andr., F.P.S. 2:111, fig. 45 (1952); Cuf., Enum. :213 (1955); Keay, F.W.T.A. ed. 2, 1:444 (1958); Sahni, Trees N. Sudan :34, fig. 13 (1968); Quézel, Dossier 5:113 (1969).

DARFUR Lowland plain, 900–1020 m; savanna. *Francis* 37; *Robertson* 105; *Wickens* 1380 & 2832. Vernacular name: (Fur & Arabic) *kulkul*. A browse shrub for all stock. Strips of the bark are used for cordage.

DISTRIBUTION Senegal to Nigeria and eastwards to the central and southern provinces of the Sudan (Map 66).

FLORISTIC CATEGORY Sudanian Domain.

197 **Cassia absus** L., Sp. Pl. :376 (1753); Oliver, F.T.A. 2:279 (1871); Broun & Massey, F.S. :162 (1929); Andr., F.P.S. 2:118 (1952); Cuf., Enum. :214 (1955); Keay, F.W.T.A. ed. 2, 1:453 (1958); Brenan, F.T.E.A. Legum.-Caesalp. :81, fig. 15 (1967); Quézel, Dossier 5:113 (1969); Valenti in Webbia 26:73, fig. 22, map 9 (1971).

DARFUR Jebel Marra, piedmont, 1200 m; lowland plain, 1030 m; rocky slopes. *Wickens* 2209 & 2748.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and south through E. Africa to southern Africa; also in tropical Asia and Australia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical weed.

198 **Cassia italica** (Miller) Lam. ex F. W. Andr., F.P.S. 2:117, fig. 49 (1952); Cuf., Enum. :217 (1955); Keay, F.W.T.A. ed. 2, 1:453, fig. 148/D (1958); Brenan in Kew Bull. 13:239 (1958) & F.T.E.A. Legum.-Caesalp. :65 (1967); Quézel, Dossier 5:113 (1969).

Senna italica Miller, Gard. Dict. ed. 8, No. 2 (1768).

Cassia obovata Collad., Hist. Cass. :92, t.15A (1816); Oliver, F.T.A. 2:277 (1871); Broun & Massey, F.S. :161 (1929), *nom. illegit.* subsp. **italica**; Brenan in *l. c.* (1958); Valenti in Webbia 26:52, fig. 16, map 7 (1971).

DARFUR Lowland plain, 900 m; waste places. *Wickens* 1373.

Vernacular name: (Fur & Arabic) *senna senna* or *senna mecca*.

Grazed by all stock. The seeds are used as a vegetable. A paste from the boiled roots is used for dressing wounds.

DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic; also N. Africa across Arabia to NW. India. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sahelian Domain and Saharo-Sindian Region.

199 **Cassia mimosoides** L., Sp. Pl. :379 (1753); Oliver, F.T.A. 2:280 (1871); Broun & Massey, F.S. :162 (1929); Andr., F.P.S. 2:121 (1952); Cuf., Enum. :218 (1955); Keay, F.W.T.A. ed. 2, 1:452 (1958); Brenan, F.T.E.A. Legum.-Caesalp. :100 (1967); Quézel, Dossier 5:113 (1969); Valenti in Webbia 26:83, fig. 27, map 1 (1971).

DARFUR Jebel Marra, massif, 1350 m; lowland plain, 1000–1100 m; alluvial soils. *Lynes* 510; *Robertson* 36; *Wickens* 2737; *Kassas* 133 (KHU & CAI, *n.v.*).

DISTRIBUTION Widespread in the tropics of the Old World. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

200 *Cassia nigricans* Vahl, Symb. Bot. 1:30 (1790); Oliver, F.T.A. 2:280 (1871); Broun & Massey, F.S. :162 (1929); Andr., F.P.S. 2:121 (1952); Cuf., Enum. :219 (1955); Keay, F.W.T.A. ed. 2, 1:452 (1958); Brenan, F.T.E.A. Legum.-Caesalp. :81 (1967); Quézel, Dossier 5:113 (1969); Valenti in Webbia 26:91, fig. 29, map 2 (1971).

DARFUR Lowland plain, 1020 m; arable land. *Wickens* 2774.

DISTRIBUTION Senegal to Nigeria and eastwards to Ethiopia, Uganda, Kenya and Tanzania; also in Arabia and India. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

201 *Cassia obtusifolia* L., Sp. Pl. :377 (1753); Brenan in Kew Bull. 13:248 (1958) & F.T.E.A. Legum.-Caesalp. :77 (1967); Wickens, For. Bull. 14(N.S.) :10 (1969); Valenti in Webbia 26:29, fig. 9, map 4 (1971).

[*C. tora* sensu Oliver, F.T.A. 2:275 (1871); Broun & Massey, F.S. :160 (1929); Andr., F.P.S. 2:116 (1952); Cuf., Enum. :220 (1955); Quézel, Dossier 5:113 (1969), et auct. mult., *non* L.]

DARFUR Jebel Marra, piedmont and foothills, c. 1200–1300 m; lowland plain, 1020–1100 m; arable lands and waste places.

Lynes 503; *Drar* 2456 (CAI, *n.v.*); *Wickens* 1323 & 1745; *Kamil* 1167. Vernacular name: (Fur & Arabic) *kowel* or *kowil*. The powdered leaves are eaten as a vegetable.

DISTRIBUTION Widespread throughout the tropics and extending northwards into southern U.S.A. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

202 *Cassia occidentalis* L., Sp. Pl. :377 (1753); Oliver, F.T.A. 2:274 (1871); Broun & Massey, F.S. :160 (1929); Andr., F.P.S. 2:116 (1952); Cuf., Enum. :219 (1955); Keay, F.W.T.A. ed. 2, 1:455, fig. 148B (1958); Brenan, F.T.E.A. Legum.-Caesalp. :78, fig. 14 (1967); Quézel, Dossier 5:113 (1969); Valenti in Webbia 26:20, fig. 6, map 8 (1971).

DARFUR Lowland plain, 900–1020 m; arable lands. *Wickens* 1378 & 2045. Vernacular name: (Fur) *derabagu*; (Arabic) *sim ed dabid*. The plant is grazed by donkeys. The boiled seeds are used as a febrifuge. There is a Fur superstition that the plant kills snakes.

DISTRIBUTION Widespread throughout the tropics, possibly native of tropical America. Widespread in the Sudan.

FLORISTIC CATEGORY Pantropical weed.

203 *Cassia sieberana* DC., Prodr. 2:489 (1825); Oliver, F.T.A. 2:270 (1871); Broun & Massey, F.S. :161 (1929); Andr., F.P.S. 2:116 (1952); Keay, F.W.T.A. ed. 2, 1:452, figs. 147 & 148A (1958); Brenan, F.T.E.A. Legum.-Caesalp. :61 (1967); Sahni, Trees N. Sudan :36, fig. 14 (1968).

DARFUR Lowland plain, 790–880 m; savanna. *Wickens* 1622 & 2902.

DISTRIBUTION Senegal to Nigeria eastwards to the central and southern provinces of the Sudan Republic and Uganda.

FLORISTIC CATEGORY Sudanian Domain.

204 *Piliostigma reticulatum* (DC.) Hochst. in Flora 29:598 (1846); Andr., F.P.S. 2:127, fig. 53 (1952); Keay, F.W.T.A. ed. 2, 1:444 (1958).

Bauhinia reticulata DC., Prodr. 2:512 (1825); Broun & Massey, F.S. :163 (1927); Quézel, Dossier 5:113 (1969).

DARFUR Jebel Marra, massif, 1825 m; lowland plain, 945 m; savanna. *Francis* 38; *Wickens* 1290 & 1615. Vernacular name:

(Fur) *damargeh*; (Arabic) *gharrub* or *kharrub*. Bark used to make a cot for a newly born child.

DISTRIBUTION Senegal to Cameroon and eastwards to the central and southern provinces of the Sudan Republic (Map 67).

FLORISTIC CATEGORY Sudanian Domain.

205 *Piliostigma thonningii* (Schum.) Milne-Redh. in Hook., Ic. Pl. 35:2, t.3460 (1947); Andr., F.P.S. 2:127 (1952); Cuf., Enum. :213 (1955); Keay, F.W.T.A. ed. 2, 1:444, fig. 145 (1958); Brenan, F.T.E.A. Legum.-Caesalp. :206, fig. 46 (1967). *Bauhinia thonningii* Schum. in Schum. & Thonn., Beskr. Guin. Pl. :203 (1827).

[*B. reticulata* sensu Broun & Massey, F.S. :163 (1929), pro parte *non* DC (1825).]

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain,

945–975 m; savanna. *Francis* 51; *Wickens* 1028 & 1121; *Kamil* 1174.

Vernacular name: (Fur) *damargeh*; (Arabic) *kharrub*.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, south through E. Africa to the Transvaal and SW. Africa.

Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

206 *Tamarindus indica* L., Sp. Pl. :34 (1753); Oliver, F.T.A. 2:308 (1871); Broun & Massey, F.S. :164 (1929); Andr., F.P.S. 2:129, fig. 54 (1952); Cuf., Enum. :211 (1955); Keay, F.W.T.A. ed. 2, 1:477 (1958); Brenan, F.T.E.A. Legum.-Caesalp. :153, fig. 32 (1967); Quézel, Dossier 5:114 (1969); Sahni, Trees N. Sudan :38, fig. 15 (1968).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 700–1000 m; riverine woodland. *Francis* 3; *Wickens* 1598 & 2942.

Normally this forms a graceful tree but there is a grove on the road from Melemm to Suni where a tangled growth is formed by the numerous root suckers arising from a spreading mass of lateral roots laid bare by erosion. Vernacular name: (Fur) *berri* or *brehii*; (Arabic) *ardeib* or *tamra hindi*. The fruit is used for preparing a refreshing drink.

DISTRIBUTION Widespread in the tropics of the Old World.

Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

Leguminosae— Mimosoideae

207 *Acacia albida* Del., Fl. Aegypt. :142, t.52, fig. 3 (1813); Oliver, F.T.A. 2:339 (1871); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :172 (1929); Andr., F.P.S. 2:133 (1952); Keay, F.W.T.A. ed. 2, 1:499 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :78, fig. 14/1 (1959); Sahni, Trees N. Sudan :40, fig. 16 (1968); Wickens in Kew Bull. 23:181, figs. 1 & 2, map 1, Pl. 1 (1969).

Faidherbia albida (Del.) Chev. in Rev. Bot. Appl. 14:876 (1934); Cuf., Enum. :207 (1955); Quézel, Dossier 5:115 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2600 m; lowland plain, 700–1100 m; dominant trees of riverine woodland

and ash piedmont and forming groves in upland grassland. *Dandy* 193 (BM!); *Francis* 52; *Robertson* 135; *Wickens* 1284, 1352, 1496,

1573, 1965b, 2840, 2841, 2842, 2843 & 2920. Vernacular name:

(Fur) *gurul* or *kurul*, pl. *kurula*; (Arabic) *haraz*. The wood is not durable, requires preservatives. The trunk is used for mortars, oil presses and drums. The wood can be used for light carpentry but is not very satisfactory. The trees are sometimes ring-barked, the stripped bark being used for bee hives. The branches are lopped for stock browse during the dry season. All stock eagerly eat the fallen pods.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal, Angola and SW. Africa; also north along the Nile valley into Israel and the Lebanon and scattered localities through the Sahara, believed to be introduced into Cyprus (Wickens *l.c.*, map 1). Widely distributed in the central provinces of the Sudan and in the northern provinces in the valley of the Nile.

FLORISTIC CATEGORY Sudano-Zambezian Region with Sahara extensions.

208 *Acacia ataxacantha* DC., Prodr. 2:459; Oliver, F.T.A. 2:343 (1871); Broun & Massey, F.S. :173 (1929); Andr., F.P.S. 2:140 (1952); Keay, F.W.T.A. ed. 2, 1:499 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :82, fig. 14/5 (1959); Quézel, Dossier 5:114 (1969).

DARFUR Jebel Marra, piedmont and foothills, 1160–1600 m; lowland plain, 950–1100 m; forming thickets at bottom of hill slopes and along river banks. *Lynes* 562; *Dandy* 42 (BM!); *Francis* 28; *Jackson* 2570; *Wickens* 1583, 1604, 1828, 2742 & 2802.

Vernacular name: (Fur) *aara*; (Arabic) *umm seneina*.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan and south through Kenya and Tanzania to Rhodesia and Mozambique; var. *australis* Burt-Davy occurs in southern Africa.

FLORISTIC CATEGORY Sudano-Zambezian Region.

209 *Acacia gerrardii* Benth. in Trans. Linn. Soc. 30:508 (1875). var. *gerrardii*; Brenan in Kew Bull. 12:369 (1958) & F.T.E.A. Legum.-Mimosoid. :119, fig. 16/46 (1959); Wickens, For. Bull. 14(N.S.) :11 (1969).

A. hebecaladoides Harms in Engl., Bot. Jahrb. 36:208 (1905); Andr., F.P.S. 2:144 (1952); Keay, F.W.T.A. ed. 2, 1:500 (1958).

DARFUR Jebel Marra, foothills, 1400 m; lowland plain, 730–1020 m; common tree on eroded basement complex or clay plain soils. *Francis* 28; *Wickens* 1509, 1601, 1770, 1830, 2025 & 2754.

Vernacular name: (Fur) *tuni*; (Arabic) *saljam*. The tree is browsed by all stock; the bark is stripped and used for cordage. The tree also produces a very poor quality gum.

DISTRIBUTION N. Nigeria and Cameroon eastwards to the Nuba Mountains and the southern provinces of the Sudan and south through E. Africa to Natal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

210 *Acacia mellifera* (Vahl) Benth. in Hook., Lond. Journ. Bot. 1:507 (1842); Oliver, F.T.A. 2:340 (1871); Broun & Massey, F.S. :172 (1929); Andr., F.P.S. 2:136 (1952). Cuf., Enum. :194 (1955); Brenan, F.T.E.A. Legum.-Mimosoid. :84, fig. 14/8 (1959); Sahni, Trees N. Sudan :44, fig. 18 (1968); Quézel, Dossier 5:114 (1969).

subsp. *mellifera*; Brenan in Kew Bull. 11:191 (1956) & F.T.E.A. Mimosoid. :84 (1959); Wickens, For. Bull. 14(N.S.) :10 (1969).

Mimosa mellifera Vahl, Symb. Bot. 3:103 (1791).

DARFUR Lowland plain, 1020 m; dominant shrub of stony basement complex and clay soils. *Francis* 17; *Wickens* 2976. This is the dominant shrub of the basement complex soils and clay plains to the east and north-west of the Jebel Marra massif as well as the basement complex hills and formerly cultivated ash soils on the eastern and northern flanks of the Jebel Marra massif. Vernacular name: (Fur) *sayi*; (Arabic) *kitir*. The wood is used for making throwing sticks (similar to a boomerang).

DISTRIBUTION Sudan Republic across to the Somali Republic and south to Tanzania; also in Egypt and SW. Arabia (Map 68). Widely distributed in the central and northern provinces of the Sudan, often in pure stands, especially on the clay plains.

FLORISTIC CATEGORY Eastern Sahelian, South Arabian and Afriental Domains.

Acacia nilotica (L.) Willd. ex Del., Fl. Aegypt. Ill. :79 (1813); Cuf., Enum. :195 (1955); Brenan, F.T.E.A. Legum.-Mimosoid. :109 (1959); Sahni, Trees N. Sudan :46 (1968).

211 subsp. *nilotica*; Brenan in Kew Bull. 9:84 (1957); Sahni, Trees N. Sudan :46, fig. 19 (1968); Wickens, For. Bull. 14(N.S.) :11 (1969).

Mimosa nilotica L., Sp. Pl. :521 (1753).

Acacia arabica (Lam.) Willd., Sp. Pl. 4:1085 (1806); Oliver, F.T.A. 2:350 (1871); Broun & Massey, F.S. :169 (1929), pro parte.

A. arabica (Lam.) Willd. var. *nilotica* (L.) Benth. in Hook., Lond. Journ. Bot. 1:500 (1842).

[*A. nilotica* sensu Andr., F.P.S. 2:147 (1952), *non* (L.) Willd. sensu stricto.]

A. nilotica (L.) Willd. ex Del. var. *nilotica*; Cuf., Enum. :195 (1955); Keay, F.W.T.A. ed. 2, 1:500 (1958).

DARFUR Lowland plain, 760–1100 m; seasonally inundated clays and riverbanks. *Wickens* 1852. Also observed to be locally abundant in the seasonally inundated clay pans between the Wadis Dabarei and Saleh. Vernacular name: (Arabic) *sunt*. Browsed by cattle and goats. The wood is used for making throwing sticks. The pods and seeds are used for tanning. An infusion of the pods is drunk to stop bleeding following the operation for the removal of the uvula from children.

DISTRIBUTION Senegal to Cameroon eastwards to the Nile valley and the central provinces of the Sudan Republic; also in Egypt and Arabia (Map 69).

FLORISTIC CATEGORY Sudanian Domain.

212 subsp. *adansonii* (Guill. & Perr.) Brenan in Kew Bull. 12:85 (1957); Sahni, Trees N. Sudan :50, fig. 20 (1968); Wickens, For. Bull. 14(N.S.) :11 (1969).

A. adansonii Guill. & Perr., Fl. Seneg. :249 (1832); Oliver, F.T.A. 2:353 (1871).

A. nilotica (L.) Del. var. *adansonii* (Guill. & Perr.) Kuntze, Rev. Gen. 1:156 (1891); Cuf., Enum. :196 (1955); Keay, F.W.T.A. ed. 2, 1:500 (1958).

A. arabica (Lam.) Willd. var. *adansoniana* Dubard in Henry & Ammann, Acacias à Tanin :8 (1913); Andr., F.P.S. 2:147 (1958).

A. arabica (Lam.) Willd. var. *adansonii* (Guill. & Perr.) A. Chev., Expl. Bot. Afr. Occid. Fr. 1:244 (1920); Broun & Massey, F.S. :169 (1929).

DARFUR Lowland plain, 760–1100 m; savanna. *Francis* 4 & 33; *Wickens* 963 & 965. Widely distributed throughout the lowlands around the Jebel Marra massif. Vernacular name: (Fur) *feten* or *peten*; (Arabic) *sunnut* & *garad* (pods). The pods and seeds are used for tanning.

DISTRIBUTION Gambia to Cameroon eastwards to the Somali Republic; also scattered across the Sahara (Map 69). Widely distributed through Darfur and Kordofan provinces of the Sudan. FLORISTIC CATEGORY Sahelian and Afriental Domains with Sahara extensions.

213 *Acacia nubica* Benth. in Hook., Lond. Journ. Bot. 1:498 (1842); Oliver, F.T.A. 2:348 (1871); Broun & Massey, F.S. :170 (1929); Andr., F.P.S. 2:148, fig. 66 (1952); Brenan in Kew Bull. 8:101 (1953); Cuf., Enum. :197 (1955); Brenan, F.T.E.A. Legum.-Mimosoid. :129, fig. 17/58 (1959); Sahni, Trees N. Sudan :50, fig. 20 (1968); Quézel, Dossier 5:114 (1969).

[*A. orfota* sensu auct. mult., *non* (Forsk.) Schweinf. (1896).]

DARFUR Jebel Marra, piedmont, 1000 m; *Acacia mellifera* thorn scrub. *Francis* 8. An occasional to frequent constituent of *A. mellifera* thorn scrub on the basement complex pediplain, usually associated with cultivation and soil erosion. Vernacular name: (Fur) *kunyirti*; (Arabic) *la'ot*.

DISTRIBUTION Northern and central provinces of the Sudan Republic, Ethiopia and Somali Republic, Uganda, Kenya and Tanzania; also in SW. Arabia and Iran (Map 70).

FLORISTIC CATEGORY Eastern Sahelian, Afriental and South Arabian Domains.

214 *Acacia polyacantha* Willd., Sp. Pl. 4:1079 (1806); Brenan, F.T.E.A. Legum.-Mimosoid. :87, fig. 14/12 (1959).

subsp. *campylacantha* (Hochst. ex A. Rich.) Brenan in Kew Bull. 11:195 (1956); Keay, F.W.T.A. ed. 2, 1:499 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :88 (1959); Sahni, Trees N. Sudan :52, fig. 21 (1968); Wickens, For. Bull. 14(N.S.) :10 (1969).

A. campylacantha Hochst. ex A. Rich., Tent. Fl. Abyss. 1:242 (1847); Andr., F.P.S. 2:137, fig. 59 (1952).

[*A. suma* sensu Broun & Massey, F.S. :172 (1929), *non* (Roxb.) Buch.-Ham. ex Voigt (1845) sensu stricto.]

A. caffra (Thunb.) Willd. var. *campylacantha* (Hochst. ex A. Rich.) Aubrév., Fl. For. Soudano-Guin. :272 (1950); Cuf., Enum. :189 (1954).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 760–1000 m; savanna, especially riverine.

Francis 43; *Wickens* 1166, 1202, 1640, 2027 & 3006; *Kassas* 248, 360:8 & 802 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *aara*; (Arabic) *umm senetina* or *kakamuut*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and southwards through E. Africa to the Transvaal. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

215 *Acacia senegal* (L.) Willd., Sp. Pl. 4:1077 (1806); Andr., F.P.S. 2:135, fig. 57 (1952); Cuf., Enum. :200 (1955); Keay, F.W.T.A. ed. 2, 1:98, fig. 159 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :92, fig. 14/17 (1959); Sahni, Trees N. Sudan :54, fig. 22 (1968); Quézel, Dossier 5:114 (1969).

var. **senegal**; Brenan, *l. c.* :93 (1959); Sahni, Trees N. Sudan :54, fig. 22 (1968).

Mimosa senegal L., Sp. Pl. :521 (1753).

Acacia verec Guill. & Perr., Fl. Seneg. 1:245, t.56 (1832); Oliver, F.T.A. 2:342 (1871); Broun & Massey, F.S. :171 (1929), *nomen illegit.*

DARFUR Jebel Marra, piedmont and foothills, 1160–1500 m; lowland plain, 1020 m; savanna. *Dandy* 40 (BM!); *Francis* 1; *Wickens* 1804. Locally abundant to dominant on the better drained stony basement complex soils in the higher rainfall areas (upwards of 800 mm) to the south and west of the Jebel Marra massif and including the foothills of Jebel Marra. The tree is not exploited for its gum as it is in Kordofan province. Vernacular name: (Fur) *saïy fata*; (Arabic) *hashab*. Produces the 'gum arabic' of commerce. The tree is neither so productive nor so heavily tapped as in the gum producing areas of Kordofan. The gum is sometimes eaten. The gum when mixed with soot is used as ink; when mixed with powdered Nubian sandstone it gives a red ink. The branches are used for brush hedges. The wood is used for throwing sticks.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south to Tanzania (Map 71). Widespread in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sahelian and Afriental Domains.

216 *Acacia seyal* Del., Fl. Aegypt. :142, t.52, fig. 2 (1813); Oliver, F.T.A. 2:351 (1871); Broun & Massey, F.S. :170 (1929); Andr., F.P.S. 2:144, fig. 64 (1952); Cuf., Enum. :201 (1955); Keay, F.W.T.A. ed. 2, 1:500 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :103, fig. 15/32 (1959); Quézel, Dossier 5:114 (1969). var. **seyal**; Brenan, *l. c.* (1959); Wickens, For. Bull. 14(N.S.) :11 (1969).

DARFUR Jebel Marra, piedmont and massif, 1180–2150 m; lowland plain, 1000–1050 m; savanna. *Dandy* 41 & 47 (both BM!); *Francis* 16; *Wickens* 1118, 1324, 2642 & 2952; *Kassas* 568 (KHU & CAI, *n.v.*). *Acacia seyal* forms pure stands on the dark grey clay soils to the west and south of the Jebel Marra massif, the drier areas to the north and east being dominated by the more xerophytic *Acacia mellifera*. Vernacular name: (Fur) *taari*; (Arabic) *talha*. The wood is used for making throwing sticks. The branches are used for brush hedges. Stakes are reputed to strike readily in moist soil. The tree produces a poor quality gum. The gum is mixed with soot or powdered Nubian sandstone to give a black or red ink; the addition of a few hairs from a cow's tail is said to improve the quality of the ink.

DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic and south to Tanzania; also scattered through the Sahara and across to Israel and Arabia (Map 72). Widely distributed through the Sudan.

FLORISTIC CATEGORY Sahel and Afriental Domains and Western Saharo-Sindian Subregion.

Acacia sieberana DC., Prodr. 2:463 (1825); Oliver, F.T.A. 2:347 (1871); Broun & Massey, F.S. :168 (1929); Andr., F.P.S. 2:144 (1952); Cuf., Enum. :202 (1955); Brenan, F.T.E.A. Legum.-Mimosoid. :127, fig. 17/57 (1959).

The three varieties found in our area may be separated as follows:

1. Branchlets glabrous or sparingly pubescent; median leaflets 2.5–4.5 mm long
var. *sieberana*
1. Branchlets tomentellous.
2. Median leaflets 2–2.5(–3) mm long; capitula 6–10 mm. diameter
var. *villosa*
2. Median leaflets 3–5.5(–3) mm long; capitula 10–16 mm diameter.
var. *vermoesenii*

217 var. **sieberana**; Keay, F.W.T.A. ed. 2, 1:499 (1958):

Brenan, *l. c.* (1959); Sahni, Trees N. Sudan :58, fig. 24 (1968); Wickens, For. Bull. 14(N.S.) :10 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2050 m; lowland plain, 670–1020 m; savanna, especially riverine. *Wickens* 1206, 1286, 2829, 2833, 2887, 2923a, 2923b & 2947. Vernacular name: (Fur) *alda*, pl. *aldanga*; (Arabic) *kuk*. The tree is among the earliest of the *Acacia* species to produce new leaves at the end of the dry season, hence it provides a valuable browse for all stock at a time when *Acacia albida* is finished as a browse. The branches are used for brush hedges.

DISTRIBUTION Senegal to Nigeria and eastwards to Ethiopia and south through E. Africa to Natal and Angola (Map 73). Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

218 var. **villosa** A. Chev. in Bull. Soc. Bot. Fr. 74:959 (1928); Keay, F.W.T.A. ed. 2, 1:499 (1958); Wickens, For. Bull. 14(N.S.) :10 (1969).

DARFUR Jebel Marra, massif, 1350–1675 m; lowland plain, 700–1020 m; savanna particularly riverine. *Wickens* 1497, 1568, 1639, 2861, 2957 & 2958. Vernacular name: (Arabic) *kuk*.

DISTRIBUTION Senegal to Nigeria eastwards to the Sudan Republic (Jebel Marra) (Map 73).

FLORISTIC CATEGORY Western Sudanian Domain.

219 var. **vermoesenii** (DeWild.) Keay & Brenan in Kew Bull. 5:364 (1951); Brenan, F.T.E.A. Legum.-Mimosoid. :128 (1959); Wickens, For. Bull. 14(N.S.) :10 (1969). *A. vermoesenii* DeWild., Pl. Bequaert. 3:69 (1925).

DARFUR Jebel Marra, piedmont and massif, 1070–1525 m; lowland plain, 1020–1100 m; savanna. *Francis* 5 & 16; *Wickens* 1347, 2159 & 2835.

DISTRIBUTION Sudan Republic (Darfur) and Ethiopia southwards through the Central African Republic and East Africa to Natal and the Transvaal (Map 73).

FLORISTIC CATEGORY Afriental and Zambezian Domains.

220 intermediate between var. **sieberana** and var. **villosa**.

DARFUR Zalingei, alluvial soils, 1020 m; *Wickens* 2893.

221 *Acacia sieberana* DC. sens. lat.

DARFUR Zalingei, clay soils, 1020 m; *Wickens* 2844.

222 *Acacia tortilis* (Forsk.) Hayne, Arzneyk. 10, t.31 (1827); Oliver, F.T.A. 2:352 (1871); Brenan in Kew Bull. 12:86 (1957) & F.T.E.A. Legum.-Mimosoid. :117 (1959).

subsp. **spirocarpa** (Hochst. ex A. Rich.) Brenan in *op. cit.* 3:88 (1957) & *l. c.*, fig. 16/44 (1959); Sahni Trees N. Sudan :63 (1968); Wickens, For. Bull. 14(N.S.) :11 (1969).

A. spirocarpa Hochst. ex A. Rich., Tent. Fl. Abyss. 1:239 (1847); Broun & Massey, F.S. :169 (1929); Cuf., Enum. :203 (1955). [*A. tortilis* sensu Andr., F.P.S. 2:142, fig. 62 (1952), *non* (Forsk.) Hayne sensu stricto.]

DARFUR Lowland plain, 950 m; *Acacia mellifera* thorn scrub. *Wickens* 2996. Vernacular name: (Fur) *saïy diko*; (Arabic) *sayal*.

DISTRIBUTION Northern and central provinces of the Sudan Republic and Ethiopia southwards to Mozambique, Rhodesia and Angola.

FLORISTIC CATEGORY Sudano-Zambezian Region.

223 *Albizia amara* (Roxb.) Boiv. in Encycl. XIXme Siècle, ed. 1, 2:34 (1834); Brenan, F.T.E.A. Legum.-Mimosoid. :151 (1959). subsp. *sericocephala* (Benth.) Brenan in Kew Bull. 10:190 (1955); Brenan, F.T.E.A. Legum.-Mimosoid. :152 (1959); Sahni, Trees N. Sudan :64, fig. 26 (1968); Wickens, For. Bull. 14(N.S.) :12 (1969).

A. sericocephala Benth. in Hook., Lond. Journ. Bot. 3:91 (1844); Andr., F.P.S. 2:154, fig. 69 (1952); Quézel, Dossier 5:114 (1969).

[*A. amara* sensu Oliver, F.T.A. 2:356 (1871); Broun & Massey, F.S. :174 (1929); Cuf., Enum. :184 (1955), *non* (Roxb.) Boiv. (1834) sensu stricto.]

DARFUR Lowland plain, 1000–1020 m; savanna. *Macintosh* 70; *Francis* 10; *Wickens* 1355 & 1500. This species replaces the more mesophytic *Anogeissus leiocarpus* in the erosion cycle on the basement complex hill slopes. Vernacular name: (Fur) *nummi* or *numti*, pl. *kumti*; (Arabic) *arad*.

DISTRIBUTION Central and southern provinces of the Sudan Republic and Ethiopia southwards to the Transvaal and Botswana.

FLORISTIC CATEGORY Sudano-Zambezian Region.

224 *Albizia anthelmintica* Brongn. in Bull. Soc. Bot. France 7:902 (1860); Oliver, F.T.A. :357 (1871); Broun & Massey, F.S. :174 (1929); Andr., F.P.S. 2:151, fig. 68 (1952); Cuf., Enum. :184 (1954); Brenan, F.T.E.A. Legum.-Mimosoid. :148 (1959).

DARFUR Jebel Marra, piedmont and massif, 1100–2500 m; savanna. *Francis* 81; *Wickens* 962 & 1366. Vernacular name: (Fur) *gerbadut*; (Arabic) *geref ad dut*. A paste from the bark is used as a vermifuge.

DISTRIBUTION Sudan Republic and Ethiopia southwards to the Transvaal and Botswana. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

225 *Albizia aylmeri* Hutch. in Broun & Massey, F.S. :175 (1929); Andr., F.P.S. 2:154 (1952); Sahni, Trees N. Sudan :66, fig. 27 (1968).

DARFUR Jebel Marra, piedmont and foothills, 1100–1400 m; savanna. *Jackson* 2566 & 2569; *Wickens* 3003.

DISTRIBUTION Only known from the central provinces of the Sudan Republic (Map 74).

FLORISTIC CATEGORY Eastern Sudanian Domain.

Note: Brenan, *vide* Sahni *l. c.*, is of the opinion that this species is only an extremely glabrous form of *A. malacophylla* (Steud. ex A. Rich.) Walp. var. *ugandensis* Bak.f. I have dissected the flowers and the seeds of both species and have found no character other than the nature of the pubescence on the leaf by which I can separate the two. *A. aylmeri* is sparsely and minutely appressed-pubescent to almost glabrous while the latter species is silky-pubescent to sparsely silky-pubescent. At present there is insufficient material of either species to determine the range of variation and the final taxonomic status of *A. aylmeri*.

226 *Albizia malacophylla* (Steud. ex A. Rich.) Walp., Ann 2:457 (1852); Andr., F.P.S. 2:151 (1952); Cuf., Enum. :186 (1954); Brenan, F.T.E.A. Legum.-Mimosoid. :145 (1959).

var. *ugandensis* Baker f., Leg. Trop. Afr. :860 (1930); Andr., F.P.S. 2:151 (1952); Keay, F.W.T.A. ed. 2, 1:502 (1958); Brenan, *op. cit.* :146 (1959).

DARFUR Jebel Marra, piedmont and massif, 1160–1340 m; lowland plain, 730 m; savanna. *Wickens* 1030, 2864 & 2935.

DISTRIBUTION Senegal to Nigeria eastwards to the southern provinces of the Sudan Republic and Uganda (Map 74).

FLORISTIC CATEGORY Sudanian Domain.

Note: var. *malacophylla*, with smaller and more numerous leaflets is restricted to Ethiopia. More material of this species is required in order to determine the range of variation and varietal limits.

227 *Albizia zygia* (DC.) Macbr. in Contrib. Gray Herb., N.S. 59:3 (1919); Andr., F.P.S. 2:154 (1952); Keay, F.W.T.A. ed. 2, 1:502 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :161, fig. 22/6 (1959).

Inga zygia DC., Mém. Fam. Lég. :440, t.65 (1825).

Albizia brounei (Walp.) Oliver, F.T.A. 2:362 (1871); Broun & Massey, F.S. :175 (1929).

A. welwitschioides Schweinf. ex Baker f., Leg. Trop. Afr. :867 (1930); Broun & Massey, F.S. :175 (1929).

DARFUR Jebel Marra, massif 1765 m; gallery forest. *Wickens* 1570; *Kamil* 1188. Vernacular name: (Fur) *buru butteh*.

DISTRIBUTION Senegal to Gabon and across to the southern provinces of the Sudan, Uganda, Kenya and Tanzania (Map 75). FLORISTIC CATEGORY Guineo-Congo Region with Sudanian extensions.

228 *Albizia* sp.

DARFUR Mortagello to Golol, small tree on basalt outcrop, 1200 m; *Wickens* 1538a.

Dichrostachys cinerea (L.) Wright & Arn., Prodr. Fl. Ind. Or. :271 (1834).

A widespread species found throughout tropical Africa and extending through tropical Asia to Indonesia and Australia. The species has been revised by Brenan & Brummitt in Bol. Soc. Brot. II, 39:61–115 (1965), where the full synonymy is given and a number of subspecies and varieties described.

subsp. **africana** Brenan & Brummitt in Bol. Soc. Brot. II 39:77 (1965).

229 var. **africana**

D. nutans (Pers.) Benth. in Hook., Lond. Journ. Bot. 4:353 (1841); Oliver, F.T.A. 2:333 (1871); Broun & Massey, F.S. :168 (1929).

D. glomerata (Forsk.) Chiov. in Ann. Bot. Roma 13:409 (1915), based on *Mimosa glomerata* Forsk., Fl. Aegypt.-Arab. :177 (1775) and presumed to be referable to *D. cinerea* (L.) Wright & Arn. but cannot be positively confirmed. Andr., F.P.S. 2:156, fig. 70 (1952), pro parte; Cuf., Enum. :208 (1955); Quézel, Dossier 5:115 (1969). *D. cinerea* (L.) Wright & Arn. subsp. *cinerea*; Brenan in Kew Bull. 12:358 (1958) & F.T.E.A. Mimosoid. :37 (1959), pro parte; Sahni, Trees N. Sudan :68, fig. 28 (1968).

DARFUR Jebel Marra, piedmont and foothills, 1160–1350 m; lowland plain, 945–1020 m; savanna. *Aglen* 29; *Francis* 2; *Wickens* 1613, 2803 & 2808; *Kamil* 1080. Vernacular name: (Fur) *gereng* or *kereng*; (Arabic) *kedad*. The shrub is browsed by camels. Branches are used for brush hedges. The bark is used for cordage. A local Fur saying is that the tree says ‘Did you finish your work? Come to me and I will give you a terrible scratch.’

DISTRIBUTION Cape Verde Is. and on the mainland from Senegal to Nigeria and eastwards to Ethiopia, south through E. Africa to the Transvaal and Natal; also in the Comoro Is. where its status is unknown. Cultivated in other parts of the tropics, Egypt, Pakistan, southern United States of America and Cuba (Map—see Brenan & Brummitt, *l. c.* fig. 1). Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

230 var. **karamojensis** Brenan & Brummitt in *op. cit.* :88 (1965).

D. cinerea (L.) Wright & Arn. subsp. *cinerea*; Brenan in *l. c.* (1958) & *l. c.* (1959), pro parte.

[*D. nutans* sensu Norman in Journ. Bot. 62:137 (1924) *non* (Pers.) Benth. (1841) sensu stricto.]

DARFUR Jebel Marra, *Lynes* 77 (BM!).

DISTRIBUTION Uganda, Kenya, Tanzania, E. Congo and the Sudan Republic (Jebel Marra) (Map—see Brenan & Brummitt, *l. c.* fig. 2).

FLORISTIC CATEGORY Afrioriental Domain.

231 *Entada abyssinica* Steud. ex A. Rich., Tent. Fl. Abyss. 1:234 (1847); Oliver, F.T.A. 2:327 (1871); Broun & Massey, F.S. :167 (1929); Andr., F.P.S. 2:158 (1952); Keay, F.W.T.A. ed. 2, 1:491 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :13, fig. 2 (1959).

var. cf. *abyssinica* vel. sp. aff.

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1821.

Stems velvety, not exactly matched.

DISTRIBUTION (of the species): Senegal to Cameroon and eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola. The variety occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

232 *Entada africana* Guill. & Perr., Fl. Seneg. :233 (1832); Oliver, F.T.A. 2:326 (1871); Brenan in Kew Bull. 10:165 (1955); Keay, F.W.T.A. ed. 2, 1:491, fig. 156 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :12 (1959); Wickens, For. Bull. 14(N.S.) :12 (1969).

E. sudanica Schweinf., Reliq. Kotsch. :8 (1868); Oliver, F.T.A. 2:327 (1871); Broun & Massey, F.S. :67 (1929); Andr., F.P.S. 2:157, fig. 71 (1952).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 700–1370 m; savanna. *Francis* 66; *Wickens* 1735 & 2924; *Kassas* 798 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *korong bisssa*; (Arabic) *surug*.

DISTRIBUTION Senegal to Cameroon and eastwards to the central and southern provinces of the Sudan Republic and Uganda.

FLORISTIC CATEGORY Sudanian Domain.

233 *Entada abyssinica* Steud. ex A. Rich. × *E. africana* Guill. & Perr.

DARFUR Jebel Marra, massif, 1340–1760 m; riverine and gallery forest. *Wickens* 1190 & 1301.

234 *Mimosa pigra* L., Cent. Pl. 1:13 (1755); Andr., F.P.S. 2:158 (1952); Cuf., Enum. :207 (1955); Keay, F.W.T.A. ed. 2, 1:495 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :43, fig. 13 (1959).

M. asperata L., Syst. Nat. ed. 10, :1312 (1759); Oliver, F.T.A. 2:335 (1871); Broun & Massey, F.S. :168 (1929).

DARFUR Lowland plain, 600–670 m; riverbanks. *Wickens* 1638, 2018 & 2944. Amballa is the most northerly point along the Wadi Azum that I have observed this species. Vernacular name: (Fur) *ngarri le jowah*; (Arabic) *shadida*.

DISTRIBUTION Widespread in tropical Africa and America, also in Madagascar and Mauritius; in Asia it is apparently only a rare introduction, not in Australia. Widely distributed in the Sudan throughout the length of the Nile and its major tributaries.

FLORISTIC CATEGORY Pantropical.

235 *Pithecellobium dulce* (Roxb.) Benth. in Hook., Lond. Journ. Bot. 3:199 (1844); Andr., F.P.S. 2:129 (1952); Cuf., Enum. :185 (1954); Brenan, F.T.E.A. Legum.-Mimosoid. :165 (1959).

Mimosa dulce Roxb., Pl. Corom. 1:67, t.99 (1795).

DARFUR Lowland plain, 950 m; site of former township of Garsila. *Wickens* 1115.

DISTRIBUTION A native of tropical America but widely cultivated in other parts of the tropics and naturalized in many places.

Introduced and cultivated in the Sudan.

FLORISTIC CATEGORY Neotropical cultigen.

236 *Prosopis africana* (Guill. & Perr.) Taub. in Engler & Prantl, Pflanzenfam. 3(3):119 (1891); Andr., F.P.S. 2:163, fig. 73 (1952); Keay, F.W.T.A. ed. 2, 1:492 (1958); Brenan, F.T.E.A. Legum.-Mimosoid. :36, fig. 10 (1959); Sahni, Trees N. Sudan :70, fig. 29 (1968).

Coulleria ?africana Guill. & Perr., Fl. Seneg. :256 (1832).

Prosopis ?oblunga Benth. in Hook., Journ. Bot. 4:348 (1841); Oliver, F.T.A. 2:331 (1871); Broun & Massey, F.S. :167 (1929).

DARFUR Lowland plain, 610–730 m; riverine woodland. *Francis* 65; *Wickens* 2926. Vernacular name: (Fur) *tindil*; (Arabic) *mesquite*.

DISTRIBUTION Senegal to Cameroon eastwards to the Sudan Republic and Uganda. Widely distributed in the southern provinces of the Sudan, also in the Nuba Mountains.

FLORISTIC CATEGORY Sudanian Domain.

Leguminosae— Papilionoideae

237 *Aeschynomene indica* L., Sp. Pl. :713 (1753); Baker in F.T.A. 2:147 (1871); Broun & Massey, F.S. :194 (1929); Andr., F.P.S. 2:171 (1952); Cuf., Enum. :295 (1955); Hepper in F.W.T.A. ed. 2, 1:580 (1958); Quézel, Dossier 5:115 (1969); Verdcourt in F.T.E.A. Legum.-Papilion. :373, fig. 54/4 (1971).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; moist sites. *Wickens* 2271 & 2292.

DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic and south through E. Africa to SW. Africa; widely distributed through the tropics and subtropics of the Old World, introduced into N. America. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

238 *Aeschynomene schimperii* Hochst. ex A. Rich., Tent. Fl. Abyss. 1:202 (1847); Baker in F.T.A. 2:146 (1871); Broun & Massey, F.S. :195 (1929); Andr., F.P.S. 2:171 (1952); Cuf., Enum. :295 (1955); Hepper in F.W.T.A. ed. 2, 1:580 (1958); Verdcourt in F.T.E.A. Legum.-Papilion. :376, fig. 55 (1971). *A. telekii* Schweinf. in von Höhnel, Zum Rud. See und Steph.-See, Anhang :866 (1892); Broun & Massey, F.S. :195 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–2050 m; swampy sites. *Macintosh* 131; *Dandy* 142 (BM!); *Wickens* 1453, 2221 & 2618. Vernacular name: (Fur) *tacta*.

DISTRIBUTION Senegal to Sierra Leone, the southern provinces of the Sudan Republic, Ethiopia and south through E. Africa to Rhodesia; also in Madagascar.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

239 *Aeschynomene uniflora* E. Mey., Comm. Pl. Afr. Austr. :123 (1836); Baker in F.T.A. 2:146 (1871); Broun & Massey, F.S. :194 (1929); Andr., F.P.S. 2:170 (1952); Hepper in F.W.T.A. ed. 2, 1:580 (1958); Verdcourt in F.T.E.A. Legum.-Papilion. :372 (1971).

var. *uniflora*; Verdcourt *l. c.* (1971).

DARFUR Jebel Marra, massif, *c.* 1900 m; lowland plain, 1020 m; swampy sites. *Wickens* 2746; *Kassas* 360:16 & 737 (both KHU & CAI *n.v.*).

DISTRIBUTION Senegal and N. Nigeria, Sudan Republic (Darfur and Upper Nile Provinces) and south through E. Africa to Natal and Angola; also in Madagascar and Mascarene Is.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

240 *Alysicarpus glumaceus* (Vahl) DC., Prodr. 2:353 (1825); Cuf., Enum. :301 (1955); Hepper in F.W.T.A. ed. 2, 1:587 (1958); Verdcourt in F.T.E.A. Legum.-Papilion. :497 (1971). subsp. *glumaceus* var. *glumaceus*; Verdcourt, *op. cit.* :498 (1971).

Hedysarum glumaceum Vahl, Symb. Bot. 2:Add. et Corrig. :106 (1791).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 2727.

DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to Angola and Natal; also in Arabia. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

- 241 **Alysicarpus rugosus** (Willd.) DC., Prodr. 2:353 (1825); Baker in F.T.A. 2:171 (1871), pro parte; Broun & Massey, F.S. :198 (1929); Cuf., Enum. :302 (1955); Hepper in F.W.T.A. ed. 2, 1:587 (1958); Wickens, For. Bull. 14(N.S.):12 (1969); Verdcourt in F.T.E.A. Legum.-Papilion. :495 (1971).
subsp. **rugosus**; Verdcourt, *l. c.* (1971).
Hedysarum rugosum Willd., Sp. Pl. 3(2):1172 (1802).
[*Alysicarpus glumaceus* sensu Andr., F.P.S. 2:175 (1952), non (Vahl) DC. (1825).]
DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; arable lands. *Wickens* 1882; *Kassas* 137 (KHU & CAI, *n.v.*).
DISTRIBUTION Mali to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Madagascar. Also occurs in the central and southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.
- 242 **Argyrolobium arabicum** (Decne.) Jaub. & Spach, Ill. Pl. Or. :115 (1843) & in Ann. Sci. Nat. II, 19:46 (1843); Polhill in Kew Bull. 22:167 (1968).
Cytisus arabicus Decne, in Ann. Sci. Nat. II, 4:78 (1835).
Argyrolobium abyssinicum Jaub. & Spach., Ill. Pl. Or. :115 (1843) & in Ann. Sci. Nat. II, 19:48 (1843); Baker in F.T.A. 2:45 (1871); Broun & Massey, F.S. :180 (1929); Andr., F.P.S. 2:175 (1952); Cuf., Enum. :242 (1955); Quézel, Dossier 5:115 (1969).
DARFUR Jebel Marra, massif, 1350–2150 m; weed of arable lands and waste places. *Blair* 267; *Wickens* 1192, 1398, 1579, 1929, 2706, 2869, 2870 & 2881; *Kassas* 410, 496, 704, 796 & 834 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *zerah*; (Arabic) *lasim*.
DISTRIBUTION Uplands of Mauritania eastwards to Ethiopia and the Yemen (Map 76). Only recorded in the Sudan from Jebel Marra and the Red Sea Hills.
FLORISTIC CATEGORY Saharo-montane and Ethiopian-montane.
- 243 **Astragalus atropilosulus** (Hochst.) Bunge, Gen. Astrag. Sp. Geront. 1:6 (1868) & 2:4 (1869) (in Mém. Acad. Imp. Sci. St. Pétersb. VII, 11. No. 16 & 15, n.l.), emend. sensu lat.; Gillett in Kew Bull. 17:415 (1964) & in F.T.E.A. Legum.-Papilion. :1054 (1971).
Diplothea atropilosula Hochst. in Flora 29:596 (1846).
subsp. **abyssinicus** (Hochst.) Gillett in *op. cit.* :417 (1964).
D. abyssinica Hochst. in Flora 29:595 (1846).
var. **abyssinicus**; Gillett in *l. c.* (1964); Wickens, For. Bull. 14(N.S.):12 (1969).
Astragalus abyssinicus (Hochst.) Steud. ex A. Rich., Tent. Fl. Abyss. 1:193 (1847); Baker in F.T.A. 2:138 (1871); Broun & Massey, F.S. :193 (1929); Andr., F.P.S. 2:176 (1952), pro parte; Cuf., Enum. :289 (1955); Quézel, Dossier 5:115 (1969).
DARFUR Jebel Marra, massif, 1340–2450 m; upland grassland. *Lynes* 122a; *Jackson* 4061; *Kassas* 132, 461:30, 650 & 712 (all KHU & CAI, *n.v.*).
DISTRIBUTION (of the species) Sudan Republic (Jebel Marra), Ethiopia and montane areas southwards to the Transvaal; also in Arabia (Map 77). The record for the Imatongs (Andrews, *l. c.*) refers to subsp. *bequaertii* (De Wild.) Gillett.
FLORISTIC CATEGORY Afro-montane (species sensu lato); Ethiopian montane (subsp. *abyssinicus*).
- 244 **Biserrula pelecinus** L., Sp. Pl. :762 (1753); Baker in F.T.A. 2:139 (1871); Broun & Massey, F.S. :189 (1929); Andr., F.P.S. 2:177 (1952); Cuf., Enum. :290 (1955); Quézel, Dossier 5:115 (1969).
subsp. **leiocarpa** (A. Rich.) Gillett in Kew Bull. 17:504 (1964) & in F.T.E.A. Legum.-Papilion. :1059, fig. 150 (1971).
B. leiocarpa A. Rich., Tent. Fl. Abyss. 1:194 (1847) pro majore parte, excl. specim. *Schimper* 1762; Norman in Journ. Bot. 62:137 (1924).
B. pelecinus L. var. *subintegra* Baker f., Leg. Trop. Afr. :271 (1929); Wickens, For. Bull. 14(N.S.):13 (1969).

DARFUR Jebel Marra, massif, 1780–2400 m; upland grassland. *Lynes* 123 (BM, syntype of var. *subintegra*!; K, isosyn.!).
Jackson 4058; *Kassas* 706, 839 & 898 (all KHU & CAI!).
DISTRIBUTION (of the species) Sudan Republic (Jebel Marra), Ethiopia and Tanzania; also from the Mediterranean region, Canary Is. (Map 78). The subspecies occurs in the Sudan (Jebel Marra) Ethiopia and Tanzania (Map 78).
FLORISTIC CATEGORY Mediterranean (subsp. *pelecinus*) with an Afro-montane extension (subsp. *leiocarpa*).
Note: subsp. *leiocarpa* differs from subsp. *pelecinus* in the racemes being 1–3 (–4) flowered instead of 2–11 flowered and the crests on each side of the pod being straight or very slightly undulate, not toothed, and in having not more than 5–6 (–7) seeds in each half of the pod. The description given by Andrews would appear to refer to subsp. *pelecinus* since it refers to fruits with broad dentate wings. I have not seen this specimen from Jebel Kurku in the Darfur plains. Andrews took his descriptions from F.T.A., which for this particular example was based on Ethiopian material, where the two subspecies overlap.

245 **Cicer arietinum** L., Sp. Pl. :738 (1753); Baker in F.T.A. 2:172 (1871), pro parte; Broun & Massey, F.S. :198 (1929); Andr., F.P.S. 2:164 (1952); Cuf., Enum. :306 (1955); Verdcourt in F.T.A. Legum.-Papilion. :1065, fig. 152 (1971).
DARFUR Lowland plain, 1020 m; arable lands. *Wickens* 1146.
DISTRIBUTION A native of SE. Europe and W. Asia, now widely cultivated; introduced into many parts of the world. Widely cultivated in the Sudan—‘Chick Pea’.
FLORISTIC CATEGORY Mediterranean, cultigen.

246 **Crotalaria atrorubens** Hochst. ex Benth. in Hook., Lond. Journ. Bot. 2:572 (1843); Baker in F.T.A. 2:22 (1871); Broun & Massey, F.S. :176 (1929); Andr., F.P.S. 2:185 (1952); Cuf., Enum. :228 (1955); Hepper in F.W.T.A. ed. 2, 1:549 (1958); Polhill in Kew Bull. 22:192 (1968).
DARFUR Jebel Marra, piedmont 1200 m; lowland plain, 950–1100 m; savanna. *Lynes* 561; *Jackson* 3274; *Wickens* 2565.
DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia. Widely distributed through the central provinces of the Sudan.
FLORISTIC CATEGORY Sudanian Domain.

247 **Crotalaria barkae** Schweinf. in Bull. Herb. Boiss. 4, App. 2:226 (1896); Cuf., Enum. :229 (1955); Hepper in F.W.T.A. ed. 2, 1:550 (1958); Polhill in Kew Bull. 22:190 (1968) & 25:276 (1971); Wickens, For. Bull. 14(N.S.):13 (1969); Polhill in F.T.E.A. Legum.-Papilion. :865 (1971).
subsp. **barkae**; Polhill in F.T.E.A. Legum.-Papilion. :866, fig. 120 (1971).
C. taubertii Baker f. in Journ. Linn. Soc. Bot. 42:390 (1914); Andr., F.P.S. 2:190 (1952); Quézel, Dossier 5:116 (1969).
DARFUR Jebel Marra, piedmont, 1130–1200 m; savanna. *Macintosh* 18; *Wickens* 2256 & 2562.
DISTRIBUTION Senegal to Ghana eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa. Widely distributed through the central and southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

248 **Crotalaria brevidens** Benth. in Hook., Lond. Journ. Bot. 2:585 (1843); Baker in F.T.A. 2:37 (1871); Broun & Massey, F.S. :177 (1929); Andr., F.P.S. 2:186 (1952); Polhill in F.T.E.A. Legum.-Papilion. :908 (1971).
C. intermedia Kotschy var. *abyssinica* Taub. ex Engl., Hochgebirgssfl. Trop. Afr. :247 (1892); Andr., F.P.S. 2:186 (1952).
var. **intermedia** (Kotschy) Polhill in Kew Bull. 22:266 (1968) & in F.T.E.A. Legum.-Papilion. :909 (1971).
C. intermedia Kotschy in Sitz. Akad. Wien 50, Abt. 1:362, t.3 (1865); Baker in F.T.A. 2:37 (1871), pro parte; Broun & Massey, F.S. :177 (1929); Andr., F.P.S. 2:186 (1952); Hepper in F.W.T.A. ed. 2, 1:551 (1958).
DARFUR Jebel Marra, massif, 1780 m. *Kassas* 903 (KHU & CAI, *n.v.*, det. Gillett).

DISTRIBUTION N. Nigeria (Bauchi Plateau), central provinces of the Sudan Republic, Ethiopia and E. Africa.

FLORISTIC CATEGORY Eastern Sudanian and Afriental Domains with Jos Extension.

249 ***Crotalaria comosa*** Baker in F.T.A. 2:34 (1871); Hepper in F.W.T.A. ed. 2, 1:550 (1958); Polhill in Kew Bull. 22:194 (1968); Wickens, For. Bull. 14(N.S.) :13 (1969).

C. dilloniana Baker in F.T.A. 2:41 (1871); Broun & Massey, F.S. :178 (1929).

C. petitiiana (A. Rich.) Walp. in Annal. 2:316 (1852); Andr., F.P.S. 2:190 (1952), pro parte; Cuf., Enum. :236 (1955), pro parte.

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; arable lands. *Wickens* 2170 & 2717; *Kassas* 148, 293, 324, 384, 389, 427, 736, 793, 862 & 894 (all KHU & CAI, *n.v.*).

DISTRIBUTION Port. Guinea to N. Nigeria eastwards to the central and southern provinces of the Sudan Republic and in Zambia and Angola.

FLORISTIC CATEGORY Sudanian and Zambezan Domains.

250 ***Crotalaria goreënsis*** Guill. & Perr., Fl. Seneg. 1:165 (1832); Baker in F.T.A. 2:28 (1871); Broun & Massey, F.S. :179 (1929); Andr., F.P.S. 2:191 (1952); Cuf., Enum. :231 (1955); Hepper in F.W.T.A. ed. 2, 1:548 (1958); Polhill in Kew Bull. 22:190 (1968); Quézel, Dossier 5:116 (1969); Polhill in F.T.E.A. Legum.-Papilion. :875 (1971).

DARFUR Jebel Marra, piedmont and massif, 1160–2200 m; arable lands, wayside and upland grassland. *Macintosh* 49; *Dandy* 82 (BM!); *Jackson* 3378; *Robertson* 145; *Pettet* 158; *Wickens* 1038, 1274 & 1427. Vernacular name: (Fur) *dagara kalu*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Rhodesia and Angola. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan Region.

251 ***Crotalaria hyssopifolia*** Klotzsch in Peters, Reise Mossamb. Bot. 1:55 (1862); Baker in F.T.A. 2:24 (1871), pro parte; Cuf., Enum. :231 (1955); Hepper in F.W.T.A. ed. 2, 1:549 (1958); Polhill in Kew Bull. 22:200 (1968); Wickens, For. Bull. 14(N.S.) :13 (1969); Polhill in F.T.E.A. Legum.-Papilion. :991 (1971).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 2726.

DISTRIBUTION Senegal to Nigeria and eastwards to Ethiopia and through Uganda and Kenya to Rhodesia and Mozambique. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan Region.

252 ***Crotalaria laburnifolia*** L., Sp. Pl. :715 (1753); Broun & Massey, F.S. :177 (1929); Andr., F.P.S. 2:185 (1952); Cuf., Enum. :233 (1955); Quézel, Dossier 5:115 (1969); Polhill in F.T.E.A. Legum.-Papilion. :856 (1971).

subsp. ***laburnifolia***; Polhill in Kew Bull. 22:209 (1968) & in F.T.E.A. Legum.-Papilion. :857 (1971).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1100 m; savanna. *Lynes* 517; *Pettet* 159; *Wickens* 1870; *Kassas* 881 (KHU & CAI, *n.v.*); *Kamil* 1086.

DISTRIBUTION Central and southern provinces of the Sudan Republic to Somali Republic and south through E. Africa to Mozambique, Rhodesia and Botswana (Map—Polhill *l. c.* Map 1); also in SE. Asia.

FLORISTIC CATEGORY Palaeotropical.

253 ***Crotalaria lachnosema*** Stapf in Bull. Misc. Inf. Kew 1910:329 (1910); Andr., F.P.S. 2:185 (1952); Hepper in F.W.T.A. ed. 2, 1:550 (1958); Polhill in Kew Bull. 22:190 (1968).

DARFUR Jebel Marra, massif, 1350–1900 m; savanna. *Wickens* 1430 & 2623; *Kassas* 283, 416, 461:31 & 805 (all KHU & CAI!). Vernacular name: (Fur) *dagara*; (Arabic) *tacta*.

DISTRIBUTION Sierra Leone to Cameroon and across to the Sudan Republic. (Jebel Marra, also recorded from Equatoria province *fide* F.W. Andr., *l. c.*)

FLORISTIC CATEGORY Sudanian Domain.

254 ***Crotalaria naragutensis*** Hutch. in Bull. Misc. Inf. Kew 1921:363 (1921); Hepper in F.W.T.A. ed. 2, 1:551 (1958); Polhill in Kew Bull. 22:193 (1968); Wickens, For. Bull. 14(N.S.) :13 (1969).

C. lyneisii Baker f. & Martin in Journ. Bot. 62:136 (1924); Andr., F.P.S. 2:188 (1952).

DARFUR Jebel Marra, piedmont and massif, 1160–2400 m; savanna upland grassland and arable lands. *Lynes* 120a (BM!) & 120b (BM, holotype of *C. lyneisii*!); *Dandy* 83 & 154 (both BM!); *Jackson* 2540 & 3314; *Blair* 263; *Kassas* 183 & 432 (both KHU & CAI, *n.v.*).

DISTRIBUTION Ghana to Cameroon and eastward to the Sudan Republic (Jebel Marra).

FLORISTIC CATEGORY Sudanian Domain.

255 ***Crotalaria ochroleuca*** G. Don, Gen. Syst. 2:138 (1832); Baker in F.T.A. 2:37 (1871); Hepper in F.W.T.A. ed. 2, 1:551 (1958); Polhill in Kew Bull. 22:193 (1968); Wickens, For. Bull. 14(N.S.) :13 (1969); Polhill in F.T.E.A. Legum.-Papilion. :908 (1971).

C. cannabina Schweinf. ex Baker f. in Journ. Linn. Soc. Bot. 42:329 (1914); Broun & Massey, F.S. :177 (1929); Andr., F.P.S. 2:186 (1952).

DARFUR Jebel Marra, massif, 1780 m; lowland 1000–1020 m; alluvial soils. *Lynes* 560; *Robertson* 37; *Kassas* 903 (KHU & CAI!).

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south to Rhodesia and Angola.

FLORISTIC CATEGORY Sudano-Zambezan Region.

256 ***Crotalaria pallida*** Aiton, Hort. Kew. 3:20 (1789); Cuf., Enum. :235 (1955); Wickens, For. Bull. 14(N.S.) :13 (1969). var. ***pallida***; Polhill in Kew Bull. 22:262 (1968) & in F.T.E.A. Legum.-Papilion. :905 (1971).

C. mucronata Desv. in Journ. Bot. Appliq. 3:76 (1814); Andr., F.P.S. 2:187, fig. 78 (1952); Hepper in F.W.T.A. ed. 2, 1:550, fig. 166 (1958).

C. striata DC., Prodr. 2:131 (1825); Baker in F.T.A. 2:38 (1871); Broun & Massey, F.S. :180 (1927).

DARFUR Jebel Marra, piedmont and massif, 1160–1370 m; alluvial soils. *Jackson* 2541; *Blair* 266; *Wickens* 1940; *Kassas* 188 (KHU & CAI, *n.v.*); *Kamil* 1087.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and south through E. Africa; widely cultivated in the tropics. Widely distributed in the Sudan.

FLORISTIC CATEGORY Pantropical cultigen.

257 ***Crotalaria podocarpa*** DC., Prodr. 2:133 (1825); Baker in F.T.A. 2:17 (1871); Broun & Massey, F.S. :179 (1929); Andr., F.P.S. 2:191 (1952); Cuf., Enum. :237 (1955); Hepper in F.W.T.A. ed. 2, 1:548 (1958); Polhill in Kew Bull. 22:224 (1968) & in F.T.E.A. Legum.-Papilion. :876 (1971).

C. flexuosa Baker in F.T.A. 2:29 (1871).

C. fulgida Baker in F.T.A. 2:32 (1871).

DARFUR Lowland plain, 1020 m; savanna. *Wickens* 2336.

DISTRIBUTION Mali, Senegal, Niger, Chad, the central and southern provinces of the Sudan Republic and Ethiopia south through E. Africa to the Cape.

FLORISTIC CATEGORY Sudanian-Zambezan Region.

258 ***Crotalaria recta*** Steud. ex A. Rich., Tent. Fl. Abyss. 1:152 (1847); Baker in F.T.A. 2:40 (1871); Andr., F.P.S. 2:188 (1952); Cuf., Enum. :238 (1955); Hepper in F.W.T.A. ed. 2, 1:550 (1958); Polhill in Kew Bull. 22:196 (1968) & in F.T.E.A. Legum.-Papilion. :957 (1971).

DARFUR Jebel Marra, massif, 1780 m; arable lands. *Wickens* 1386. Vernacular name: (Fur) *kani kuringa*.

DISTRIBUTION N. Nigeria and Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal. Also occurs in Equatoria Province of the Sudan (*fide* F.W. Andr.) but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambezan Region.

259 **Crotalaria spinosa** *Hochst. ex Benth.* in Hook., Lond. Journ. Bot. 2:576 (1843); Baker in F.T.A. 2:17 (1871); Broun & Massey, F.S. :177 (1929); Andr., F.P.S. 2:184 (1952); Cuf., Enum. :240 (1955); Polhill in Kew Bull. 22:197 (1968) & in F.T.E.A. Legum.-Papilion. :970, fig. 133 (1971).

C. minima Baker f. in Journ. Bot. 34:52 (1896).

DARFUR Jebel Marra, foothills and massif, 1400–1780 m; arable lands. *Wickens* 3001; *Kassas* 833 (KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic, Ethiopia and south through E. Africa to Zambia and Angola; also in Aden. Widespread through the central and southern provinces of the Sudan *vide* F. W. Andr., but no specimens seen other than from Jebel Marra.

FLORISTIC CATEGORY Afriental and Zambeian and South Arabian Domains.

260 **Crotalaria steudneri** *Schweinf.* in Verh. Zool.-Bot. Ges. Wien 18:651 (1868); Baker in F.T.A. 2:30 (1871); Cuf., Enum. :240 (1955); Polhill in Kew Bull. 22:195 (1968); Wickens, For. Bull. 14(N.S.) :13 (1969); Polhill in F.T.E.A. Legum.-Papilion. :936 (1971).

DARFUR Jebel Marra, foothills, 1130 m; lowland plain, 1020 m; savanna and arable lands. *Wickens* 2095 & 2245.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and in Tanzania, Malawi, Zambia, Rhodesia, Botswana, the Transvaal and SW. Africa.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

261 **Dalbergia melanoxyloides** *Guill. & Perr.*, Fl. Seneg. :227, t.53 (1832); Baker in F.T.A. 2:233 (1871); Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S. :207 (1929); Andr., F.P.S. 2:192 (1952); Cuf., Enum. :304 (1955); Hepper in F.W.T.A. ed. 2, 1:515 (1958); Sahni, Trees N. Sudan :72, fig. 30 (1968); Quézel, Dossier 5:116 (1969); Polhill in F.T.E.A. Legum.-Papilion. :100, fig. 211-9 (1971).

DARFUR Jebel Marra, piedmont and massif, 1200–1525 m; lowland plain, 800–1000 m; savanna. *Lynes* 125; *Francis* 19; *Wickens* 1602, 1611 & 2930. Vernacular name: (Fur) *sambil*; (Arabic) *babanus*.

DISTRIBUTION Senegal and N. Nigeria eastwards to Ethiopia and south through E. Africa to Angola and the Transvaal; also in western India. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian & Deccan Regions.

262 **Desmodium gangeticum** (L.) DC., Prodr. 2:327 (1825); Baker in F.T.A. 2:161 (1871); Broun & Massey, F.S. :196 (1929); Andr., F.P.S. 2:193 (1952); Cuf., Enum. :298 (1955); Hepper in F.W.T.A. ed. 2, 1:584 (1958); Schubert in F.T.E.A. Legum.-Papilion. :467, fig. 65/10 (1971).

Hedysarum gangeticum L., Sp. Pl. :746 (1753).

Desmodium gangeticum L. var. *maculatum* Baker in Fl. Brit. Ind. 2:168 (1876); Hepper in *l. c.* (1958).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1596 & 1865.

DISTRIBUTION Port. Guinea to Cameroon and eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal; throughout the Old World tropics. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

263 **Desmodium repandum** (Vahl) DC., Prodr. 2:334 (1825); Andr., F.P.S. 2:195 (1952); Cuf., Enum. :299 (1955); Hepper in F.W.T.A. ed. 2, 1:584 (1958); Schubert in F.T.E.A. Legum.-Papilion. :465, fig. 65/11 (1971).

Hedysarum repandum Vahl, Symb. Bot. 2:82 (1791).

Desmodium scalpe DC., Prodr. 2:334 (1825); Baker in F.T.A. 2:164 (1871); Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S. :196 (1929).

DARFUR Jebel Marra, massif, 1340–2225 m. *Lynes* s.n. (BM!) & 124; *Kassas* 262 & 827 (both KHU & CAI, *n.v.*).

DISTRIBUTION Sierra Leone to Cameroon and eastwards to Ethiopia and south through E. Africa to the Cape; widespread in the tropics and subtropics of the Old World. Widespread through southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

264 **Desmodium salicifolium** (Poir.) DC., Prodr. 2:337 (1825); Andr., F.P.S. 2:195 (1952); Cuf., Enum. :300 (1955); Hepper in F.W.T.A. ed. 2, 1:584 (1958); Schubert in F.T.E.A. Legum.-Papilion. :469, fig. 65/1 (1971).

Hedysarum salicifolium Poir., Encycl. Bot. 6:402 (1804).

Desmodium paleaceum Guill. & Perr., Fl. Seneg. Tent. :209 (1838); Baker in F.T.A. 2:166 (1871); Broun & Massey, F.S. :196 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–1600 m; gallery forest and stream banks. *Dandy* 53 & 56 (both BM!); *Jackson* 2557; *Blair* 265; *Wickens* 1065 & 1527; *Kassas* 242 & 1018 (both KHU & CAI, *n.v.*); *Kamil* 1151.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal; also in Madagascar and the Mascarene Is. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian and Madagascan Regions.

265 **Dolichos trilobus** L., Sp. Pl. :726 (1753), pro parte; Verdcourt in Taxon 17:171 (1968), in Kew Bull. 24:422 (1970) & in F.T.E.A. Legum.-Papilion. :678 (1971).

subsp. **trilobus** var. **trilobus**; Verdcourt in *l. c.* :679.

D. falcatus Klein ex Willd., Sp. Pl. 3:1047 (1802); Cuf., Enum. :341 (1955); *non* Hepper in F.W.T.A. ed. 2, 1:571 (1958); Wickens, For. Bull. 14(N.S.) :13 (1969).

D. debilis Hochst. ex A. Rich., Tent. Fl. Abyss. 1:223 (1847); Baker in F.T.A. 2:213 (1871).

DARFUR Lowland plain, 1020 m; savanna. *Wickens* 2337 (leaf shape atypical).

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia into Kenya, Tanzania, Mozambique and Natal; also in India, Ceylon, Burma, China and the Philippines.

FLORISTIC CATEGORY Palaeotropical.

266 **Eriosema nutans** *Schinz* in Bull. Herb. Boiss. II, 8:629 (1908); Verdcourt in F.T.E.A. Legum.-Papilion. :775 (1971). [*E. polystachum* sensu Baker in F.T.A. 2:225 (1871), pro parte quoad descr. *non* (A. Rich.) Bak. (1871), *nec* E. Mey. (1835).] *E. richardii* Benth. ex Baker f. & Haydon in Leg. Trop. Afr. :505 (1929); Staner & DeCraene in Rev. Zool. Bot. Afr. 24:284 (1934), descr. ampl.; Andr., F.P.S. 2:198 (1952); Cuf., Enum. :328 (1955).

[*E. parviflorum* sensu Wickens, For. Bull. 14(N.S.) :14 (1969), *non* E. Mey. (1836).]

DARFUR Jebel Marra, massif, 1950 m; upland grassland. *Wickens* 2610.

DISTRIBUTION Sudan Republic and Ethiopia southwards through E. Africa to the Transvaal. Also found in the Sudan in the Imatongs.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

267 **Eriosema psoraleoides** (Lam.) G. Don, Gen. Syst. 2:348 (1832); Andr., F.P.S. 2:198 (1952); Cuf., Enum. :328 (1955); Hepper in F.W.T.A. ed. 2, 1:557, fig. 167 (1958), Verdcourt in F.T.E.A. Legum.-Papilion. :772 (1971).

Crotalaria psoraleoides Lam., Encycl. Bot. 2:201 (1784).

Eriosema cajanoioides (Guill. & Perr.) Hook.f., Fl. Nigr. :314 (1849); Baker in F.T.A. 2:227 (1871); Broun & Massey, F.S. :206 (1929).

DARFUR Jebel Marra, piedmont; 1160 m; savanna. *Robertson* 2. DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, the Transvaal and Angola; also in Madagascar. Also occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian and Madagascan Regions.

268 *Erythrina sigmoidea* Hua in Bull. Mus. Hist. Nat. I, 3:327 (1897); Hepper in F.W.T.A. ed. 2, 1:562 (1958); Wickens, For. Bull. 14(N.S.): 14 (1969).
E. dybowskii Hua in Bull. Soc. Linn. Paris II, 1:52 (1898); Broun & Massey, F.S.: 200 (1929).
E. eriosticha Harms in Engl., Bot. Jahrb. 49:442 (1913); Andr., F.P.S. 2:201 (1952).
E. sudanica Baker f., Leg. Trop. Afr. 2:371 (1929); Andr., F.P.S.: 201 (1952), **synon. nov.**
 DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1100 m; savanna. *Lynes* 564 (BM, holotype of *E. sudanica*!); *Macintosh* 116; *Aglen* 11; *Wickens* 1561, 1673 & 1823; *Kassas* 365 & 798 (both KHU & CAI, *n.v.*); *Kamil* 1072.
 Vernacular name: (Fur) *gerri* or *suus*; (Arabic) *rabb el arus* or *shuush*.

DISTRIBUTION Port. Guinea to Cameroon and eastwards through the Central African Republic to the Sudan Republic (Darfur) (Map 79).

FLORISTIC CATEGORY Sudanian Domain.

Note: This is a very variable species. The Jebel Marra material is a good match with specimens from the Portuguese Guinea area, while specimens from Cameroon and Central African Republic tend to have a longer and yellowish-green indumentum. Further correlated collections of flowers, leaves and fruit are necessary in order that the range of variation can be examined.

269 *Flemingia grahamiana* Wright & Arn., Prodr. Fl. Pen. Ind. Or. 1:242 (1834); Verdcourt in F.T.E.A. Papilion.: 806, fig. 115 (1971).

F. rhodocarpa Baker in F.T.A. 2:231 (1871).

Moghania grahamiana (Wright & Arn.) Kuntze, Rev. Gen. 1:199 (1891); Hepper in F.W.T.A. ed. 2, 1:559 (1958); Wickens, For. Bull. 14(N.S.): 15 (1969).

M. rhodocarpa (Baker) Hauman in Fl. Congo Belge 6:258 (1955); Cuf., Enum.: 328 (1955).

DARFUR Jebel Marra, massif, 1850 m; fallow lands. *Wickens* 1435. Not recorded elsewhere in the Sudan.

DISTRIBUTION Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and Natal; also in Aden and southern India.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

270 *Glycine wightii* (R. Grah. ex Wight & Arn.) Verdc. in Taxon 15:35 (1966) & in F.T.E.A. Legum.-Papilion.: 528 (1971).

Notonia wightii Grah. ex Wight & Arn., Prodr. Fl. Pen. Ind. Or.: 208 (1834).

subsp. *wightii* var. *longicauda* (Schweinf.) Verdc. in Taxon

15:36 (1966) & in F.T.E.A. Legum.-Papilion.: 529 (1971).

Glycine longicauda Schweinf. in Verh. Zool.-Bot. Ges. Wien 18:658 (1868).

[*G. javanica* sensu Baker in F.T.A. 2:178 (1871); Broun & Massey, F.S.: 199 (1929); Andr., F.P.S. 2:203 (1952); Cuf., Enum.: 313 (1955); Hepper in F.W.T.A. ed. 2, 1:564 (1958); Quézel, Dossier 5:116 (1969), *non* L. (1753), *nec* auct. al. sensu stricto.]

G. javanica L., subsp. *micrantha* (A. Rich.), F. J. Hermann in U.S. Dept. Agric. Tech. Bull. 1268:31, fig. 9 (1962); Wickens, For. Bull. 14(N.S.): 14 (1969).

DARFUR Jebel Marra, massif, 1900 m; arable lands. *Wickens* 2603. DISTRIBUTION Guinée Republic, N. Nigeria and Cameroon, Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to Angola and SW. Africa; also in Arabia. Central and southern Sudan *vide* F. W. Andr. but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambezian Region.

271 *Indigofera arrecta* Hochst. ex A. Rich., Tent. Fl. Abyss.

1:184 (1847); Baker in F.T.A. 2:97 (1871); Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:136 (1924); Broun & Massey, F.S.: 187 (1929); Andr., F.P.S. 2:215, fig. 82 (1952); Cuf., Enum.: 261 (1955); Gillett in F.W.T.A. ed. 2, 1:541, fig. 165 (1958) & in Kew Bull. Add. Ser. 1:105 (1958); Quézel, Dossier 5:116 (1969); Gillett in F.T.E.A. Legum.-Papilion.: 307, fig. 43/4 (1971).

I. umbonata Welw. ex Baker in F.T.A. 2:98 (1871).

DARFUR Jebel Marra, massif, 1340–2500 m; upland grassland and fallow lands. *Lynes* s.n. (BM!); *Jackson* 2613 & 4062; *Wickens* 1219, 1258, 2452 & 2651; *Kassas* 239, 336, 443, 445, & 552 (all KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and southwards through E. Africa to Natal, the Transvaal and Angola; also in Madagascar and southern Arabia. The range of this species has probably been greatly extended through cultivation as it is one of the chief indigo-producing species (Gillett *l. c.*: 105). Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudan-Zambezian and Madagascan Regions.

272 *Indigofera costata* Guill. & Perr., Fl. Seneg. Tent.: 187 (1832); Baker in F.T.A. 2:95 (1871); Broun & Massey, F.S.: 188 (1929); Andr., F.P.S. 2:218 (1952); Gillett in F.W.T.A. ed. 2, 1:543 (1958) in Kew Bull. Add. Ser. 1:125 (1958) & in F.T.E.A. Legum.-Papilion.: 320 (1971).

subsp. *costata*; Gillett in *l. c.* (1958).

DARFUR Jebel Marra, piedmont and massif, 1150–1830 m; lowland plain, 1100 m; savanna and arable lands. *Lynes* 519; *Macintosh* 107; *Wickens* 1326, 1553, 2093, 2131, 2237 & 2563.

DISTRIBUTION Senegal, Niger and N. Nigeria, possibly Chad, and the Sudan Republic (Darfur) (Map 80).

FLORISTIC CATEGORY Western Sudanian Domain (subsp. *macra* (E. Mey.) Gillett, *theuschii* (O. Hoffm.) Gillett and *goniodes* (Hochst. ex Baker) Gillett from the Afriental and Zambezian Domains).

273 *Indigofera hochstetteri* Baker in F.T.A. 2:101 (1871); Andr., F.P.S. 2:219 (1952); Cuf., Enum.: 266 (1955); Gillett in F.W.T.A. ed. 2, 1:538 (1958) & in Kew Bull. Add. Ser. 1:113 (1958); Quézel, Dossier 5:116 (1969); Gillett in F.T.E.A. Legum.-Papilion.: 223, fig. 36/7 (1971).

I. anabaptista Steud. ex Baker in Hook. f., Fl. Brit. Ind. 2:102 (1876); Broun & Massey, F.S.: 187 (1929).

I. arenaria A. Rich., Tent. Fl. Abyss. 1:183 (1847); *non* E. Mey.

(1836) et sensu Baker in F.T.A. 2:79 (1871); Andr., F.P.S. 2:208 (1952).

DARFUR Jebel Marra, piedmont, 1160 m; seasonally wet clay pan. *Wickens* 2105 & 2196.

DISTRIBUTION Mauritania to N. Nigeria eastwards to the Somali Republic, Uganda, Kenya and Tanzania; also S. Arabia and the Indian subcontinent. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian, Afriental and South Arabian Domains and the Deccan Region.

274 *Indigofera longicalyx* Gillett in Kew Bull. 10:583 (1956), in F.W.T.A. ed. 2, 1:543 (1958) and in Kew Bull. Add. Ser. 1:543 (1958).

DARFUR Jebel Marra, piedmont and massif, 1160–1375 m; fallow lands. *Wickens* 2177, 2273 & 2515.

DISTRIBUTION Uplands of Guinée Republic, Sierra Leone, N. Nigeria; Central African Republic and the Sudan Republic (Jebel Marra) (Map 81).

FLORISTIC CATEGORY Afro-montane.

275 *Indigofera parviflora* Heyne ex Wight & Arn., Prodr. Fl.

Pen. Ind. Or.: 201 (1834); Baker in F.T.A. 2:83 (1871); Broun & Massey, F.S.: 184 (1929); Andr., F.P.S. 2:218 (1952); Cuf., Enum.: 269 (1955); Gillett in Kew Bull. Add. Ser. 1:126 (1958) & in F.T.E.A. Legum.-Papilion.: 321 (1971).

var. *parviflora*; Gillett in *l. c.* (1958).

DARFUR Jebel Marra, massif, 1780 m. *Kassas* 842 (KHU & CAI!). DISTRIBUTION Northern and central provinces of the Sudan Republic and Ethiopia south through East Africa to the Cape; also in India and NW. Australia.

FLORISTIC CATEGORY Palaeotropical.

276 **Indigofera pulchra** Willd., Sp. Pl. 3:1239 (1802); Baker in F.T.A. 2:76 (1871); Broun & Massey, F.S. :183 (1929); Andr., F.P.S. 2:210 (1952); Gillett in F.W.T.A. ed. 2, 1:538 (1958), in Kew Bull. Add. Ser. 1:30 (1958) & in F.T.E.A. Legum.-Papilion. 235 (1971).

DARFUR Jebel Marra, massif, 1350–1780 m. *Dandy* 46 (BM!); *Kassas* 744 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and southwards through Uganda and Tanzania to Zambia and Angola, common in W. Africa but rare in Ethiopia and E. Africa. Sparsely distributed through the central provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian Region.

277 **Indigofera spicata** Forsk., Fl. Aegypt.-Arab. :138 (1775); Gillett in F.W.T.A. ed. 2, 1:542 (1958) & in Kew Bull. Add. Ser. 1:119 (1958); Wickens, For. Bull. 14(N.S.) :14 (1969); Gillett in F.T.E.A. Legum.-Papilion. :317, fig. 46/17 (1971).

I. hendecaphylla Jacq., Coll. Bot. 2:358 (1789) & Ic. Pl. Rar. t.570 (1788–89); Andr., F.P.S. 2:212 (1952); Cuf., Enum. :265 (1955). [*I. endecaphylla* Jacq. sensu Lam., Encycl. Bot. Suppl. 3:147 (1813); Baker in F.T.A. 2:96 (1871); Broun & Massey, F.S. :188 (1929).]

DARFUR Jebel Marra, massif, 1375–2500 m; lowland plain, 1020 m; savanna and arable lands. *Aglen* 13; *Pettet* 161; *Wickens* 984, 1503 & 2514.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and south to Natal and the Transvaal; also in Madagascar, Yemen, India, Ceylon, Burma, Siam, Philippines, Indonesia and south to Australia, introduced into America. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical weed.

278 **Indigofera stenophylla** Guill. & Perr., Fl. Seneg. 1:188, t.48 (1832); Baker in F.T.A. 2:83 (1871); Broun & Massey, F.S. :184 (1929); Andr., F.P.S. 2:218 (1952); Gillett in F.W.T.A. ed. 2, 1:539 (1958), in Kew Bull. Add. Ser. 1:38 (1958) & in F.T.E.A. Legum.-Papilion. :236 (1971). var. **stenophylla**; Gillett in *L. c.* (1958); Wickens, For. Bull. 14(N.S.) :14 (1958).

DARFUR Jebel Marra, foothills, 1150 m; savanna. *Wickens* 2236. DISTRIBUTION Senegal to N. Nigeria eastwards to the central and southern provinces of the Sudan Republic, Uganda and Tanzania.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

279 **Indigofera tinctoria** L., Sp. Pl. :751 (1753); Baker in F.T.A. 2:99 (1871); Broun & Massey, F.S. :187 (1929); Andr., F.P.S. 2:215 (1952); Cuf., Enum. :276 (1955); Gillett in F.W.T.A. ed. 2, 1:541 (1958), in Kew Bull. Add. Ser. 1:106 (1958) & in F.T.E.A. Legum.-Papilion. :308 (1971).

I. houer Forsk., Fl. Aegypt.-Arab. :137 (1775); Cuf., Enum. :266 (1955).

I. orthocarpa (DC.) Berg in Berg & Schmidt, Darstell. & Beschreib. Offic. Gew. 4:30d (1863); Baker in F.T.A. 2:99 (1871); Broun & Massey, F.S. :188 (1929), *non* Presl (1844), *nom. illegit.*

DARFUR Lowland plain, 1050 m; hillside. *Wickens* 2088.

DISTRIBUTION Senegal to Cameroon and westwards to the Somali Republic and south through E. Africa to Zambia and Angola; also in Madagascar and from India to New Guinea, introduced into tropical America. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical cultigen.

280 **Indigofera vicioides** Jaub. & Spach, Ill. Pl. Or. t.481 (1856); Baker in F.T.A. 2:81 (1871); Cuf., Enum. :277 (1955); Gillett in Kew Bull. Add. Ser. 1:73 (1958) & in F.T.E.A. Legum.-Papilion. :277 (1971).

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; savanna and upland grassland. *Wickens* 2134, 2139 & 2972.

A new record for the Sudan. In the absence of fruiting material it is not possible to be absolutely certain as to the identity nor to place in a variety.

DISTRIBUTION (sens. lat.) Congo Republic to Ethiopia, Kenya and Tanzania to the Transvaal and SW. Africa.

FLORISTIC CATEGORY Afriental and Zambezian Domains.

281 **Lablab purpureus** (L.) Sweet, Hort. Brit. ed. 1, :481 (1827); Verdc. in Kew Bull. 24:410 (1970) & in F.T.E.A. Legum.-Papilion. :696 (1971).

Dolichos purpureus L., Sp. Pl. ed. 2, :1021 (1763).

D. lablab L., Sp. Pl. :725 (1753); Baker in F.T.A. 2:210 (1871); Broun & Massey, F.S. :203 (1929).

Lablab niger Medic. in Vorles. Churpf. Phys. Ges. 2:354 (1787); Andr., F.P.S. 2:219 (1952); Cuf., Enum. :339 (1955); Hepper in F.W.T.A. ed. 2, 1:571 (1958).

subsp. **uncinatus** Verdc. in *L. c.* (1970) & in F.T.E.A. Legum.-Papilion. :699, fig. 104/1–17 (1971).

Lablab uncinatus A. Rich., Tent. Fl. Abyss. 1:225 (1847) *nomen nud.*

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; moist sites. *Dandy* 34 (BM!); *Wickens* 1103 & 1417. Vernacular name: (Fur) *mandinang baad*.

DISTRIBUTION Senegal eastwards to Ethiopia and south to the Cape. Both wild and cultivated in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

282 **Lathyrus sativus** L., Sp. Pl. :730 (1753); Baker in F.T.A. 2:174 (1871); Broun & Massey, F.S. :198 (1929); Andr., F.P.S. 2:164 (1952); Cuf., Enum. :310 (1955).

DARFUR Lowland plain, 1020 m; arable lands. *Wickens* 1339.

DISTRIBUTION Origin unknown but naturalized and cultivated in the warm temperate regions of the world. Cultivated in the Sudan in the Nile valley, especially in the northern provinces.

FLORISTIC CATEGORY Subcosmopolitan cultigen.

283 **Lonchocarpus laxiflorus** Guill. & Perr., Fl. Seneg. 1:226 (1832); Baker in F.T.A. 2:242 (1871), *pro parte*; Broun & Massey, F.S. :208 (1929); Andr., F.P.S. 2:221, fig. 83 (1952); Cuf., Enum. :305 (1955); Hepper in F.W.T.A. ed. 2, 1:523 (1958); Sahni, Trees N. Sudan :74, fig. 31 (1968); Polhill in F.T.E.A. Legum.-Papilion. :67 (1971).

DARFUR Jebel Marra, piedmont and massif, 1160–1525 m; savanna. *Lynes* s.n.; *Francis* 22; *Wickens* 1178. Vernacular name: (Arabic) *khash khash*.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and Uganda (Map 82). Widely distributed through the central and southern provinces.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

284 **Lotononis platycarpus** (Viv.) Pic.-Serm. in Webbia 7:331 (1950); Andr., F.P.S. 2:221 (1952); Milne-Redhead in F.T.E.A. Legum.-Papilion. :813, fig. 118/11–20 (1971).

Lotus platycarpus Viv., Pl. Aeg. Dec. 4:14, t.2, fig. 9 (1830).

Lotononis lebordea Benth. in Hook., Lond., Journ. Bot. 2:607 (1843); Baker in F.T.A. 2:5 (1871); Dümmer in Trans. Roy. Soc. S. Afr. 3:311 (1913); Broun & Massey, F.S. :175 (1929), *nom. illegit.*

DARFUR Jebel Marra, massif, 1900–2290 m. *Kassas* s.n. (KHU & CAI!).

DISTRIBUTION Tibesti, Sudan Republic (Jebel Marra, Red Sea Hills and Jebel U'weinat), Ethiopia and south through Kenya and Tanzania to the Cape; also from Morocco across N. Africa and Arabia to the Sind, generally rather scattered (Map 83). FLORISTIC CATEGORY Karoo Namid Region extending sporadically through the Afriental and Zambezian Domains and Saharo-Sindian Region.

Note: The genus has been monographed by Dümmer in Trans. R. Soc. S. Afr. 3:275–335 (1913). The majority of the species occur in S. Africa; *L. platycarpus* is the most widely dispersed. Dümmer considers it problematic whether it is native of S. Africa, although its affinities, according to his monograph would appear to be with the S. African species. It is a weedy pioneer of the arid and semi-arid regions.

285 ***Lotus arabicus* L.**, Mant. 1:104 (1767); Baker in F.T.A. 2:62 (1871); Broun & Massey, F.S. :181 (1929); Andr., F.P.S. 2:222 (1952); Cuf., Enum. :256 (1955); Hepper in F.W.T.A. ed. 2, 1:553 (1958); Gillett in Kew Bull. 13:375 (1958) & in F.T.E.A. Legum.-Papilion. :1048, fig. 146/16 (1971). [*L. glinoides* sensu Baker in F.T.A. 2:63 (1871); Broun & Massey, F.S. :182 (1929); Andr., F.P.S. 2:221 (1952), *non* Del. (1837).] DARFUR Lowland plain, 1000 m; alluvial soils. *Wickens* 2896. DISTRIBUTION From Senegal to N. Nigeria to Egypt, Ethiopia and south through Tanzania, Malawi, Mozambique, Rhodesia and the Transvaal into Angola; also through Arabia to Baluchistan. Widely distributed through the northern and central provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

286 ***Lotus corniculatus* L.**, Sp. Pl. 775 (1753). var. ***eremanthus* Chiov.**, Racc. Bot. Miss. Consol. Kenya :29 (1935); Cuf., Enum. :257 (1955); Gillett in Kew Bull. 13:367 (1958); Wickens, For. Bull. 14(N.S.) :15 (1969); Gillett in F.T.E.A. Legum.-Papilion. :1043 (1971). [*L. corniculatus* sensu Baker in F.T.A. 2:63 (1871); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :182 (1929); Andr., F.P.S. 2:221 (1952) *pro parte*, *non* L. sensu stricto.] DARFUR Jebel Marra, massif, 1780–2600 m; moist sites. *Lynes* 13 (BM!) & 83; *Macintosh* 95; *Sandison* 37 & 38 (both BM!); *Steele* 15; *Aglen* 21; *Jackson* 2605, 2631 & 3383; *Robertson* 142; *Blair* 269; *Wickens* 1249, 1259, 1416 & 2883; *Kassas* 587 & 777 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *dagara*; (Arabic) *tacta*. DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Kenya and Tanzania; other forms of the species widespread in Europe and temperate Asia. FLORISTIC CATEGORY (of variety). Afriental Domain with a Jebel Marra extension.

287 ***Mundulea sericea* (Willd.) A. Chev.** in Compt. Rend. Acad. Sci. Paris 180:1521 (1925); Andr., F.P.S. 2:223, fig. 84, (1952); Cuf., Enum. :285 (1955); Hepper in F.W.T.A. ed. 2, 1:527 (1958); Quézel, Dossier 5:117 (1969); Gillett in F.T.E.A. Legum.-Papilion. :155, fig. 28 (1971). *Cytisus sericeus* Willd., Sp. Pl. 3:1121 (1802). *Mundulea suberosa* (DC.) Benth. in Miq., Pl. Jungh. :248 (1852); Baker in F.T.A. 2:126 (1871); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :191 (1929). DARFUR Jebel Marra, massif, 1190–1980 m; lowland plain, 900 m; savanna. *Lynes* 87c & 97; *Macintosh* 61; *Aglen* 2; *Wickens* 1203, 1278, 1626 & 2816. Vernacular name: (Fur) *deili*; (Arabic) *koldos* or *tayr*. An infusion of the bark is used for treating diabetes. The seeds are reputed to be fatal to donkeys. DISTRIBUTION Mali to Cameroon eastwards to the Somali Republic and southwards through E. Africa to Natal, the Transvaal and SW. Africa; also in the Mascarene Is., Madagascar and from India to New Guinea. Occurs in the Nuba Mountains and the southern provinces of the Sudan. FLORISTIC CATEGORY Palaeotropical.

288 ***Pterocarpus lucens* Lepr. ex Guill. & Perr.**, Fl. Seneg. 1:228 (1832); Baker in F.T.A. 2:238 (1871), *pro parte*; Broun & Massey, F.S. :208 (1929); Andr., F.P.S. 2:226 (1952); Cuf., Enum. :305 (1955); Hepper in F.W.T.A. ed. 2, 1:517, fig. 163A (1958); Sahni, Trees N. Sudan :76, fig. 32 (1968); Polhill in F.T.E.A. Legum.-Papilion. :82, fig. 161/–2 (1971). *P. simplicifolius* Baker in F.T.A. 2:238 (1871). DARFUR Jebel Marra, piedmont and massif, 1160–1340 m; lowland plain, 750–1500 m; savanna. *Francis* 27, 55 & 70; *Wickens* 1299, 1514, 1557, 1619, 2936 & 2940. Vernacular name: (Arabic) *abiad*. DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and Uganda (Map 84). Widely distributed through the central and southern provinces of the Sudan. FLORISTIC CATEGORY Sudanian and Afriental Domains.

289 ***Rhynchosia malacophylla* (Sprengel) Bojer**, Hort. Maurit. :104 (1837); Cuf., Enum. :323 (1955); Verdcourt in F.T.E.A. Legum.-Papilion. :753, fig. 109/38 (1971). *Glycine malacophylla* Sprengel, Syst. cur. post. :270 (1827). *Rhynchosia sennaarensis* Hochst. ex Schweinf. in Verh. Zool.-Bot. Ges. Wien 18:655 (1868); Andr., F.P.S. 2:227 (1952); Cuf., Enum. :325 (1955). *R. flavissima* Hochst. ex Baker in F.T.A. 2:219 (1871); Broun & Massey, F.S. :204 (1929). DARFUR Jebel Marra, massif, 1780 m. *Kassas* 812 (KHU & CAI!). DISTRIBUTION Central provinces of the Sudan Republic, Ethiopia, Somali Republic, Uganda, Kenya & Tanzania. FLORISTIC CATEGORY Sudanian and Afriental Domains.

***Rhynchosia minima* (L.) DC.**, Prodr. 2:385 (1825); Baker in F.T.A. 2:219 (1871), *pro parte*; Cuf., Enum. :324 (1955); Verdcourt in F.T.E.A. Legum.-Papilion. :756 (1971). *Dolichos minimus* L., Sp. Pl. :726 (1753).

290 var. ***memnonia* (Del.) Cooke**, Fl. Bombay 1:389 (1903); Cuf., Enum. :324 (1955); Meikle in F.W.T.A. ed. 2, 1:555 (1958); Wickens, For. Bull. 14(N.S.) :15 (1969). *Dolichos memnonia* Del., Fl. Aegypt. :254, t.38, fig. 3 (1813). *Rhynchosia memnonia* (Del.) DC., Prodr. 2:386 (1825); Baker in F.T.A. 2:220 (1871); Broun & Massey, F.S. :205 (1929); Andr., F.P.S. 2:228, fig. 85 (1954); Quézel, Dossier 5:117 (1969). DARFUR Jebel Marra, massif, 1675 m; fallow lands. *Wickens* 1850. DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic; also in Egypt and Arabia. Widely distributed through the northern and central provinces of the Sudan. FLORISTIC CATEGORY Sahelian, Afriental and S. Arabian Domains.

291 var. ***prostrata* (Harvey) Meikle** in Kew Bull. 9:275 (1954) & in F.W.T.A. ed. 2, 1:555 (1958); Wickens, For. Bull. 14(N.S.) :15 (1969); Verdcourt in F.T.E.A. Legum.-Papilion. :758, fig. 109/42 (1971). *Rhynchosia memnonia* (Del.) DC. var. *prostrata* Harvey in Fl. Cap. 2:253 (1862). [*R. minima* sensu Andr., F.P.S. 2:228 (1952) *pro parte*, *non* (L.) DC. sensu stricto; Quézel, Dossier 5:117 (1969).] DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; savanna. *Wickens* 1350; *Kassas* 419 (KHU & CAI, *n.v.*). DISTRIBUTION Ghana to Cameroon eastwards to the Somali Republic and south to the Transvaal and Natal. Widely distributed throughout the Sudan. FLORISTIC CATEGORY Sudano-Zambezian Region.

292 ***Rhynchosia resinosa* (Hochst. ex A. Rich.) Baker** in F.T.A. 2:218 (1871); Broun & Massey, :206 (1929); Andr., F.P.S. 2:227 (1952); Cuf., Enum. :324 (1955); Meikle in F.W.T.A. ed. 2, 1:554 (1958); Verdcourt in F.T.E.A. Legum.-Papilion. :727 (1971). *Agelaea resinosa* Hochst. ex A. Rich., Tent. Fl. Abyss. 1:226 (1847). DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna. *Robertson* 120; *Pettet* 160; *Blair* 264; *Wickens* 978; *Kassas* 135 & 766 (both KHU & CAI!, det. Gillett). DISTRIBUTION Guinée Republic to N. Nigeria eastwards to Ethiopia and south through E. Africa to Transvaal and Natal. Occurs in the southern provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian Region.

293 ***Rhynchosia totta* (Thunb.) DC.**, Prodr. 2:338 (1825); Cuf., Enum. :326 (1955); Verdcourt in F.T.E.A. Legum.-Papilion. :747 (1971). *Glycine totta* Thunb., Prodr. Pl. Cap. :131 (1800). var. ***venulosa* (Hiern) Verdc.** in Kew Bull. 25:99 (1971) & in F.T.E.A. Legum.-Papilion. :748 (1971). *Dolicholus venulosus* Hiern, Cat. Afr. Pl. Welw. 1:271 (1896). ?*Rhynchosia lynesii* Baker f. & Martin in Journ. Bot. 62:137 (1924); Andr., F.P.S. 2:230 (1952); Quézel, Dossier 5:117 (1969). *R. tibetica* de Miré, Gillett & Quézel in Journ. Agric. Trop. et Bot. Appl. 4:155 (1957); Quézel, Mission Bot. Tibesti :147, pl. 3A (1958) **synon. nov.**

DARFUR Jebel Marra, massif. *Lynes* 87a (holotype of *R. lynesii*, I have been unable to find this specimen either at Kew or the BM); *Macintosh* 17; *Kassas* 337, 500 & 803 (all KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to the Transvaal and SW. Africa.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

294 ***Sesbania sesban*** (L.) Merrill in Philipp. Journ. Sci. Bot. 7:235 (1912); Andr., F.P.S. 2:232 (1952); Cuf., Enum. :288 (1955); Hepper in F.W.T.A. ed. 2, 1:532 (1958); Gillett in Kew Bull. 17:112 (1963) & in F.T.E.A. Legum.-Papilion. :339, fig. 49/4 (1971).

Aeschynomene sesban L., Sp. Pl. :714 (1753).

Sesbania aegyptiaca Poir. in Lam., Encycl. Bot. 7:128 (1806),

[*Sesban aegyptiacus*]; Baker in F.T.A. 2:134 (1871).

subsp. ***sesban*** var. ***nubica*** Chiov., Fl. Somala 1:145 (1929) & 2:163 (1932); Gillett *l.c.* (1971).

[*S. aegyptiaca* sensu Baker in F.T.A. 2:134 (1871); Broun & Massey, F.S. :192 (1929) et auct. plur. pro majore parte, *non* Poir. (1806).]

DARFUR Jebel Marra, piedmont and massif, 1160–1600 m; stream bank. *Macintosh* 97; *Dandy* 55 (BM!); *Wickens* 1024.

Vernacular name: (Fur) *goranggal*; (Arabic) *sesaban*.

DISTRIBUTION Lake Chad to the Somali Republic and south through E. Africa to Natal. Widely distributed in the Sudan along the Nile and its tributaries.

FLORISTIC CATEGORY Sudano-Zambeian Region.

295 ***Stylosanthes fruticosa*** (Retz.) Alston in Trimen, Handb.

Fl. Ceylon 6, Suppl. :77 (1931); Cuf., Enum. :296 (1955);

Wickens, For. Bull. 14(N.S.) :15 (1969); Verdc. in Kew Bull.

24:59 (1970) & in F.T.E.A. Legum.-Papilion. :437, fig. 62 (1971).

Arachis fruticosa Retz., Obs. Bot. 5:26 (1788).

Stylosanthes mucronata Willd., Sp. Pl. 3:1166 (1802); Baker in F.T.A. 2:157 (1871); Hepper in F.W.T.A. ed. 2, 1:575 (1958), *nom. illegit.*

S. bojeri Vogel in Linnaea 12:68 (1838); Baker in F.T.A. 2:157 (1871).

S. flavicans Baker in F.T.A. 2:156 (1871); Broun & Massey, F.S. :195 (1929); Andr., F.P.S. 2:234 (1952); Quézel, Dossier 5:117 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; moist sites. *Wickens* 1892 & 2172; *Kassas* 182, 428 & 819 (all KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic and south through E. Africa to the Transvaal, Angola and SW. Africa; also in Madagascar, Arabia, Ceylon and India. Also occurs in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian, Madagascan and Deccan Regions.

296 ***Tephrosia bracteolata*** Guill. & Perr., Fl. Seneg. 1:194

(1832); Baker in F.T.A. 2:116 (1871); Andr., F.P.S. 2:240

(1952); Cuf., Enum. :279 (1955); Hepper in F.W.T.A. ed. 2, 1:530 (1958); Brummitt in Bol. Soc. Brot. II, 41:331 (1968);

Gillett in F.T.E.A. Legum.-Papilion. :199 (1971).

T. kotschyana Hochst. ex A. Rich., Tent. Fl. Abyss. 1:186 (1847); Broun & Massey, F.S. :189 (1929).

DARFUR Jebel Marra, massif, 1340 m; lowland plain, 1020 m; savanna. *Wickens* 2546 & 2773.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi, Zambia and Angola (Map—Brummitt, *l.c.* fig. 6). Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

297 ***Tephrosia purpurea*** (L.) Pers., Syn. Pl. 2:329 (1807);

Baker in F.T.A. 2:124 (1871); Broun & Massey, F.S. :190 (1929);

Andr., F.P.S. 2:239 (1952); Cuf., Enum. :282 (1955); Hepper in F.W.T.A. ed. 2, 1:530 (1958); Quézel, Dossier 5:117 (1969);

Gillett in F.T.E.A. Legum.-Papilion. :186 (1971).

Cracca purpurea L., Sp. Pl. :752 (1753).

subsp. ***leptostachya*** (DC.) Brummitt in Bol. Soc. Brot. II, 41:245 (1968).

Tephrosia leptostachya DC., Prodr. 2:251 (1825); Broun & Massey, F.S. :190 (1929).

var. ***pubescens*** Baker in F.T.A. 2:125 (1871); Broun & Massey, F.S. :191 (1929); Brummitt in Bol. Soc. Brot. II, 41:247 (1968);

Gillett in *op. cit.* :188 (1971).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 2185 & 2265.

DISTRIBUTION Mali to Nigeria and eastwards to the Somali Republic and south through E. Africa to Angola, the Transvaal and SW. Africa (Map—see Brummitt, *l.c.* fig. 3). Also occurs in Kordofan Province of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

298 ***Vermifruax abyssinica*** (A. Rich.) Gillett in Kew Bull.

20:245 (1966); Wickens, For. Bull. 14(N.S.) :15 (1969).

Helminthocarpus abyssinicum A. Rich., Tent. Fl. Abyss. 1:200 (1847);

Baker in F.T.A. 2:60 (1871); Norman in Journ. Bot. 62:137

(1924); Broun & Massey, F.S. :188 (1929); Andr., F.P.S. 2:203

(1952); Cuf., Enum. :256 (1955), *non* Fée (1837)—a lichen.

DARFUR Jebel Marra, massif, 1340–2850 m; upland meadow and stream banks. *Lynes* s.n. (BM!), 37g & 119 (BM!); *Macintosh* 28;

Sandison 55, 56 & 57; *Dandy* 187 (BM!); *Jackson* 3359; *Robertson*

125; *Blair* 262, 268 & 286; *Wickens* 1214, 2373, 2398 & 2871;

Kassas 464:6, 507, 577 & 687 (all KHU & CAI, *n.v.*); *Sahni* 436.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and the Yemen (Map 85).

FLORISTIC CATEGORY Ethiopian Montane with a Jebel Marra extension.

299 ***Vigna frutescens*** A. Rich., Tent. Fl. Abyss. 1:218 (1847);

Baker in F.T.A. 2:196 (1871); Verdc. in Kew Bull. 24:547

(1970) & in F.T.E.A. Legum.-Papilion. :647 (1971).

subsp. ***kotschy*** (Schweinf.) Verdc. in *op. cit.* :549 (1970).

V. kotschy Schweinf., Rel. Kotschy. :29, t.22 (1868); Baker in

F.T.A. 2:198 (1871); Broun & Massey, F.S. :202 (1929); Andr.,

F.P.S. 2:247 (1952); Cuf., Enum. :333 (1955).

[*V. incana* sensu Broun & Massey, F.S. :201 (1929), *non* Taub. (1895).]

DARFUR Jebel Marra, foothills and massif, 1300–1400 m; savanna.

Aglen 19; *Wickens* 1824; *Kamil* 1096.

DISTRIBUTION Southern provinces of the Sudan Republic and Ethiopia.

FLORISTIC CATEGORY Eastern Sudanian and Afriental Domains.

300 ***Vigna macrorhyncha*** (Harms) Milne-Redh. in Bull. Misc.

Inf. Kew 1936:473 (1936); Andr., F.P.S. 2:245 (1952); Hepper

in F.W.T.A. ed. 2, 1:568 (1958); Verdc. in Kew Bull. 24:562

(1970) & in F.T.E.A. Legum.-Papilion. :658, fig. 97 (1971).

Phaseolus macrorhynchus Harms in Engl., Bot. Jahrb. 28:409 (1900).

P. stenocarpus Harms in *op. cit.* 30:91 (1901); Broun & Massey,

F.S. :201 (1929).

DARFUR Jebel Marra, massif, 1430 m; savanna. *Macintosh* 96;

Wickens 1865.

DISTRIBUTION N. Nigeria, southern provinces of the Sudan Republic and Ethiopia south through E. Africa to Zambia and Rhodesia.

FLORISTIC CATEGORY Sudano-Zambeian Region.

301 ***Vigna oblongifolia*** A. Rich., Tent. Fl. Abyss. 1:220 (1847);

Baker in F.T.A. 2:196 (1871); Verdc. in Kew Bull. 24:527

(1970) & in F.T.E.A. Legum.-Papilion. :629 (1971).

var. ***parviflora*** (Welw. ex Baker) Verdc. in *op. cit.* :528 (1970) &

in *l.c.* :629 (1971).

Vigna parviflora Welw. ex Baker in F.T.A. 2:201 (1871); Cuf.,

Enum. :335 (1955); Wickens For. Bull. 14(N.S.) :16 (1969).

DARFUR Jebel Marra, piedmont, 1160 m; marsh. *Wickens* 2260.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to Rhodesia, Botswana and Angola.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

302 **Vigna vexillata** (L.) A. Rich., Ess. Fl. Cuba (Span. ed.) :191 (1845); Baker in F.T.A. 2:199 (1871); Broun & Massey, F.S. :202 (1929); Andr., F.P.S. 2:247 (1952); Cuf., Enum. :337 (1955); Hepper in F.W.T.A. ed. 2, 1:567 (1958); Wickens, For. Bull. 14(N.S.) :15 (1969); Verdcourt in Kew Bull. 24:553 (1970) & in F.T.E.A. Legum.-Papilion. :652 (1971).

Phaseolus vexillatus L., Sp. Pl. :724 (1753).

var. **vexillata**; Verdcourt in *op. cit.* :554 (1970) & in *l. c.* :653 (1971).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 900 m; *Acacia seyal* savanna. *Wickens* 2036 & 2195.

DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic and south through E. Africa to the Cape; widespread in the tropics. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Panropical.

303 **Zornia glochidiata** Reichenb. ex DC., Prodr. 2:316 (1825); Andr., F.P.S. 2:248 (1952); Cuf., Enum. :297 (1955); Milne-Redh. in F.W.T.A. ed. 2, 1:575 (1958); Quézel, Dossier 5:118 (1969); Milne-Redh. in F.T.E.A. Legum.-Papilion. :444 (1971). [*Z. diphylla* sensu Baker in F.T.A. 2:158 (1871); Broun & Massey, F.S. :195 (1929), pro parte, *non* (L.) Pers. (1807).]

DARFUR Jebel Marra, foothills and massif, 1300–1340 m; lowland plain 1050 m; savanna. *Wickens* 2234, 2316 & 2540. Vernacular name: (Arabic) *ab lesseg* or *lesseig* or *umm shilini*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; also in Madagascar. Widespread throughout the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

Salicaceae

304 **Salix subserrata** Willd., Sp. Pl. 4:671 (1806); Andr., F.P.S. 2:250 (1952); Cuf., Enum. :4 (1953); Meikle in F.W.T.A. ed. 2, 1:588 (1958).

S. safsaf Forsk. ex Trautv., Salic. :6, t.2 (1836); Skan in F.T.A. 6(2):318 (1917); Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :209 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–2750 m; stream banks. *Lynes s.n.* & 162; *Jackson* 2627 (FHO, *n.v.*); *Wickens* 999, 1090, 1256, 2555 & 26651; *Kassas* 527 (KHU & CAI, *n.v.*); *Kamil* 1196. Jebel Marra massif from the piedmont plain and lower foothills (1150 m) to upwards of 2500 m. Seasonal observations showed that leaf fall began in July, just before the peak rains. Flowering commenced in early September, towards the end of the rains, and was followed almost immediately by new leaves. Fruits were seen in November. Flowers and fruits were again observed during January and February, suggesting that there were two flowering cycles. Vernacular name: (Fur) *geela*. DISTRIBUTION Widely distributed through tropical Africa and northwards into Libya, Egypt and Palestine. Widely distributed in the northern and central provinces of the Sudan, especially along the Nile and its tributaries.

FLORISTIC CATEGORY Sudano-Zambezian Region with northern extensions.

Note: *S. subserrata* appears to be a highly variable species whose range is not yet accurately known. There are a number of dubious species that should possibly be reduced to synonymy, but in the absence of adequate correlated collections of male and female catkins plus mature leaves, it is not yet possible to come to any taxonomic decision. In the Sudan *Salix murielii* Skan and *S. schweinfurthii* Skan require further collections and investigation.

Ulmaceae

305 **Celtis integrifolia** Lam., Encycl. Bot. 4:140 (1797); Rendle in F.T.A. 6(2):7 (1916); Broun & Massey, F.S. :158 (1929); Andr., F.P.S. 2:251, fig. 87 (1952); Cuf., Enum. :5 (1952); Keay, F.W.T.A. ed. 2, 1:592, fig. 171 (1958); Polhill in Kew Bull. 19:140 (1964) & F.T.E.A. Ulmac. :7 (1966); Sahni, Trees N. Sudan :78, fig. 33 (1968).

DARFUR Lowland plain, 790–1020 m; river banks. *Francis* 49; *Wickens* 1513, 1621 & 2897. Vernacular name: (Fur) *goni*; (Arabic) *mahajirai*. Fruit edible.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia and Uganda; also in Arabia (Map 86). Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian, Afrioriental and South Arabian Domains.

306 **Trema orientalis** (L.) Blume, Mus. Bot. Lugd.-Bat. 2:62 (1852); Polhill in Kew Bull. 19:143 (1964) & F.T.E.A. Ulmac. :10, fig. 3 (1966); Wickens, For. Bull. 14(N.S.) :16 (1969). *Celtis orientalis* L., Sp. Pl. :1044 (1753), pro parte, excl. syn.

Trema guineënsis (Schum. & Thonn.) Ficalho, Pl. Ut. Afr. Port. :261 (1884); Rendle in F.T.A. 6(2):11 (1916); Broun & Massey, F.S. :159 (1929); Andr., F.P.S. 2:256, fig. 89 (1952); Cuf., Enum. :6 (1953); Keay, F.W.T.A. ed. 2, 1:592 (1958).

DARFUR Jebel Marra, massif, 1765 m; gallery forest. *Wickens* 1315. Vernacular name: (Arabic) *kulma*.

DISTRIBUTION Portuguese Guinea eastwards to Ethiopia and south to the Cape; also in Madagascar, Mascarene Is. and tropical Asia (Map 87). Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

Note: *T. orientalis* is a frequent early coloniser of secondary forests, sometimes forming pure stands (Richards, Tropical Rain Forest (1957)). It also occurs in the riverine and gallery forests where its ecological status is uncertain. In these habitats it usually occurs as a tree; there is also a shrubby form that occurs in the savanna areas of the Sudano-Zambezian Region which Polhill, *l. c.* (1966) regards as an ecotype. Further field research will be necessary before the variation within this taxon is properly understood.

Moraceae

307 **Dorstenia walleri** Hemsley in Gard. Chron. 14:178 (1893); Rendle in F.T.A. 6(2):68 (1916); Broun & Massey, F.S. :210 (1929); Andr., F.P.S. 2:259 (1952); Keay, F.W.T.A. ed. 2, 1:599 (1958).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1050 m; rocky slopes. *Wickens* 1859 & 1979.

DISTRIBUTION Dahomey to Cameroon and eastwards to the southern provinces and the Nuba Mountains of the Sudan Republic, Tanzania, Malawi, Mozambique and Zambia.

FLORISTIC CATEGORY Sudanian and Zambezian Domains.

308 **Ficus capensis** Thunb., Diss. Fic. :13 (1786); Hutch. in F.T.A. 6(2):101 (1916); Broun & Massey, F.S. :211 (1929); Andr., F.P.S. 2:265 (1952); Keay, F.W.T.A. ed. 2, 1:606 (1958). DARFUR Jebel Marra, massif, 1350 m. *Kassas* 249 (KHU & CAI!). DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

309 **Ficus glumosa** Del., Cent. Pl. Méroé :63 (1826); Hutch. in F.T.A. 6(2):171 (1916); Broun & Massey, F.S. :213 (1929); Cuf., Enum. :11 (1953); Andr., F.P.S. 2:270 (1954); Keay, F.W.T.A. ed. 2, 1:609 (1958).

var. **glumosa**; Andr., F.P.S. 2:270 (1954); Keay, *l.c.* (1958).

DARFUR Lowland plain, 885–1050 m; savanna. *Francis* 29; *Wickens* 1650.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, Uganda, Kenya and Tanzania. Widely distributed through all the provinces.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

310 ***Ficus hochstetteri*** (Miq.) A. Rich., Tent. Fl. Abyss. 2:267 (1851); Hutch. in F.T.A. 6(2):174 (1916).

Urostigma hochstetteri Miq. in Hook., Lond. Journ. Bot. 6:555 (1847).

DARFUR Jebel Marra, massif, 1850 m; ash badlands. *Wickens* 2722.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, eastern Congo, Kenya and Tanzania.

FLORISTIC CATEGORY Afriental and Zambezan Domains with a Jebel Marra extension.

311 ***Ficus ingens*** (Miq.) Miq., Ann. Mus. Lugd.-Bat. 3:288 (1867); Hutch. in F.T.A. 6(2):121 (1916); Broun & Massey, F.S. :213 (1929); Andr., F.P.S. 2:268 (1952); Cuf., Enum. :12 (1953); Quézel, Dossier 5:118 (1969).

var. ***tomentosa*** Hutch. in Fl. Cap. 5(2):530 (1925); Keay, F.W.T.A. ed. 2, 1:607 (1958); Wickens, For. Bull. 14(N.S.) :16 (1969).

F. ingentoides Hutch. in Bull. Misc. Inf. Kew 1915:319 (1915) & in F.T.A. 6(2):123 (1916); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :213 (1929); Andr., F.P.S. 2:268 (1952); Cuf., Enum. :12 (1953).

DARFUR Jebel Marra, piedmont and massif, 1160–2525 m; savanna and gallery forest. *Lynes* 161; *Dandy* 58 (BM!); *Wickens* 1085, 1313 & 1572; *Kassas* 293:5 (KHU & CAI, n.v.); *Kamil* 1178. Vernacular name: (Fur) *buro foiya*; (Arabic) *gomeiz*. Fruit edible. DISTRIBUTION N. Nigeria, Sudan Republic (Jebel Marra), Ethiopia and south to the Transvaal.

FLORISTIC CATEGORY Sudano-Zambezan Region.

312 ***Ficus iteophylla*** Miq., Ann. Mus. Bot. Lugd.-Bat. 3:218 (1867); Hutch. in F.T.A. 6(2):203 (1917); Broun & Massey, F.S. :215 (1929); Andr., F.P.S. 2:272 (1952); Keay, F.W.T.A. ed. 2, 1:610 (1958).

DARFUR Jebel Marra, massif, 1780 m; lowland plain, 1020 m; savanna. *Wickens* 1321; *Kassas* 782 (KHU & CAI, n.v.).

DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic.

FLORISTIC CATEGORY Sudanian Domain.

Note: Differs from *F. dekdekana* (Miq.) A. Rich. in having a densely pubescent receptacle.

313 ***Ficus palmata*** Forsk., Fl. Aegypt.-Arab. :179 (1775); Hutch. in F.T.A. 6(2):93 (1916); Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :211 (1929); Andr., F.P.S. 2:263 (1952); Cuf., Enum. :13 (1953).

DARFUR Jebel Marra, massif, 1900–2600 m; upland grassland. *Lynes* s.n. & 41; *Rugman* 1; *Dandy* 180 (BM!); *Jackson* 2614 (FHO, n.v.); *Francis* 64; *Wickens* 1207 & 2444; *Kassas* 452, 286 & 592 (all KHU & CAI, n.v.). Vernacular name: (Fur) *buro kurru*; (Arabic) *gomeiz*.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, also Egypt, Arabia and northern India (Map 88).

FLORISTIC CATEGORY Afriental Domain and Saharo-Sindian Region.

314 ***Ficus platyphylla*** Del., Cent. Pl. Méroé :62 (1826); Hutch. in F.T.A. 6(2):197 (1917); Broun & Massey, F.S. :215 (1929); Andr., F.P.S. 2:272 (1952); Cuf., Enum. :13 (1953); Keay, F.W.T.A. ed. 2, 1:609 (1958).

F. kotschyana (Miq.) Miq., Ann. Mus. Bot. Lugd.-Bat. 3:288 (1867).

DARFUR Jebel Marra, foothills and massif, 1200–1750 m; river bank and terraced hill slopes. *Francis* 75; *Wickens* 1890. Vernacular name: (Fur) *bogu*; (Arabic) *gomeiz*. Fruit edible.

DISTRIBUTION Gambia to N. Nigeria eastwards to the Somali Republic and Uganda. Also occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

315 ***Ficus salicifolia*** Vahl, Symb. Bot. 1:82, t.xxiii (1790); Hutch. in F.T.A. 6(2):115 (1916); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :213 (1929); Andr., F.P.S. 2:265, fig. 93 (1952); Quézel, Dossier 5:118 (1969).

DARFUR Jebel Marra, piedmont and massif, 1090–1850 m; savanna and stream bank. *Lynes* s.n.; *Wickens* 1296 & 1458; *Kassas* 326, 327, 332, 371 & 890 (all KHU & CAI, n.v.).

Vernacular name: (Arabic) *sisi* or *umm sisi*.

DISTRIBUTION Northern and central provinces of the Sudan Republic, Ethiopia and the Somali Republic southwards to E. Africa, also in the Saharan mountains, Arabia and Socotra (Map—see Lebrun & Peyre in Adansonia II, 11:115, fig. 3 (1971)).

FLORISTIC CATEGORY Sahelian, Afriental, and South Arabian Domains.

316 ***Ficus sur*** Forsk., Fl. Aegypt.-Arab. :180 (1775); Hutch. in F.T.A. 6(2):100 (1916); Cuf., Enum. :15 (1953).

DARFUR Jebel Marra, piedmont and massif, 1160–c. 1800 m; gallery forest. *Drar* 2334 (CAI!); *Wickens* 1948.

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia, also in Arabia (Map 89).

FLORISTIC CATEGORY Afriental and South Arabian Domains with a Jebel Marra extension.

317 ***Ficus sycomorus*** L., Sp. Pl. :1059 (1753); Hutch. in F.T.A. 6(2):95 (1916); Broun & Massey, F.S. :211 (1929); Andr., F.P.S. 2:263, fig. 92 (1952); Cuf., Enum. :15 (1953).

F. gnaphalocarpa (Miq.) Steud. ex A. Rich., Tent. Fl. Abyss.

2:270 (1851); Hutch. in F.T.A. 6(2):104 (1916); Broun & Massey, F.S. :212 (1929); Andr., F.P.S. 2:265 (1952); Cuf., Enum. :11 (1953); Keay, F.W.T.A. ed. 2, 1:606 (1958); Quézel, Dossier 5:118 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2200 m; lowland plain, 600–900 m; savanna. *Dandy* 35 (BM!); *Francis* 68; *Wickens* 1074, 1275, 1379 & 1630. Vernacular name: (Fur) *buro* or *bugo*, pl. *buronga*; (Arabic) *gomeiz*. Fruit edible.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal, the Transvaal and SW. Africa; also in Egypt, Palestine and Arabia and the Comoro Islands. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan Region with extensions to Palestine.

Note: *Ficus gnaphalocarpa* was originally separated from *F. sycomorus* on account of its axillary instead of panicle receptacles. White, For. Fl. N. Rhodesia :30 (1962) has united the two species following the discovery of both axillary and panicle receptacles being found on the same plant, and the absence of any other reliable distinguishing characters.

318 ***Ficus thonningii*** Blume in Rumphia 2:17 (1838); Hutch. in F.T.A. 6(2):187 (1917); Broun & Massey, F.S. :214 (1929); Andr., F.P.S. 2:270 (1952); Cuf., Enum. :15 (1953); Keay, F.W.T.A. ed. 2, 1:610 (1958).

DARFUR Jebel Marra, massif, 1850–1900 m. *Dandy* 182 (BM).

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, south through E. Africa to Malawi, Rhodesia and Angola. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan Region.

319 ***Morus acidosa*** Griff., Not. Pl. Asia 4:308 (1854).

[*M. indica* sensu Hutch. in F.T.A. 6(2):20 (1916), non L. (1753).]

DARFUR Jebel Marra, piedmont, 1160 m; hedgerow escape.

Wickens 1052.

DISTRIBUTION Native of temperate and subtropical Himalayan region, cultivated in E. Africa, India, China and Japan.

FLORISTIC CATEGORY Himalayan Region.

Urticaceae

320 **Girardinia heterophylla** (Vahl) Decne. in Jacq., Voy. Ind. 4:151, fig. 153 (1844); Letouzey in Fl. Cameroun 8:110, fig. 17 (1968).

Urtica heterophylla Vahl, Symb. Bot. 1:76 (1790).

Girardinia condensata (Steud.) Wedd. in Ann. Sci. Nat. IV, 1:181 (1854); Rendle in F.T.A. 6(2):266 (1917); Andr., F.P.S. 2:278 (1952); Keay, F.W.T.A. ed. 2, 1:618 (1958).

DARFUR Jebel Marra, massif, 1375–1525 m; shady sites. *Pettet* 163; *Wickens* 2521; *Kassas* 247 & 296 (both KHU & CAI, *n.v.*).

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Angola and the Transvaal; also in Arabia, India and China. Also found in the Sudan in the Imatongs.

FLORISTIC CATEGORY Palaeotropical.

321 **Parietaria debilis** Forster f. in Fl. Aust. Prodr. 73 (1786); Rendle in F.T.A. 6(2):298 (1917); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :217 (1929); Andr., F.P.S. 2:278 (1952); Cuf., Enum., :21 (1953); Keay, F.W.T.A. ed. 2, 1:622 (1958); Quézel, Dossier 5:118 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2975 m; gallery forest and rock crevices. *Lynes* 192 (BM!); *Wickens* 2115, 2388 & 2537.

DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia and E. Africa to Natal and the Cape (Map 90); widely distributed in the temperate regions and in the tropical highlands.

FLORISTIC CATEGORY Pantemperate and tropical montane.

322 **Pilea tetraphylla** (Steud.) Blume, Mus. Bot. Lugd.-Bat. 2:50 (1856); Rendle in F.T.A. 6(2):270 (1917); Andr., F.P.S. 2:279 (1952); Cuf., Enum. :19 (1953); Keay, F.W.T.A. ed. 2, 1:621 (1958).

Urtica tetraphylla Steud. in Flora 33:260 (1850).

DARFUR Jebel Marra, piedmont and massif, 1160–1300 m; moist rocks. *Wickens* 2125 & 2537.

DISTRIBUTION Cameroon Mtn. and from the Sudan Republic (Jebel Marra and the Imatongs) and Ethiopia southwards through E. Africa to Malawi and Zambia; also in Madagascar.

FLORISTIC CATEGORY Sudan-Zambezian and Madagascan Regions.

Celastraceae

323 **Maytenus buchananii** (Loes.) Wileczek in Fl. Congo Belge 9:125 (1960); Wickens, For. Bull. 14(N.S.) :17 (1969).

Gymnosporia buchananii Loes. in Engl., Bot. Jahrb. 28:153 (1900).

Maytenus ovata (Wall. ex Wight & Arn.) Loes. var. *ovata* forma *pubescens* Blakelock in Kew Bull. 11:240 (1956); Keay & Blakelock in F.W.T.A. ed. 2, 1:625 (1958); Cuf., Enum. :478 (1958).

DARFUR Jebel Marra, piedmont, 1160 m; gallery forest. *Wickens* 1531.

DISTRIBUTION Ivory Coast to Cameroon eastwards to the Sudan Republic (Jebel Marra and the Didinga Hills), Ethiopia (*fide* Cufodontis) and south through E. Africa to Zambia, Mozambique and Angola; also in Arabia.

FLORISTIC CATEGORY Sudano-Zambezian Region.

324 **Maytenus senegalensis** (Lam.) Exell in Bol. Soc. Brot. II, 26:223 (1952); Andr., F.P.S. 2:281, fig. 99 (1952); Keay & Blakelock in F.W.T.A. ed. 2, 1:624, fig. 177 (1958); Cuf., Enum. :479 (1958); Quézel, Dossier 5:119 (1969).

Celastrus senegalensis Lam., Encycl. Méth. Bot. 1:661 (1785); Oliver, F.T.A. 1:361 (1868).

Gymnosporia senegalensis (Lam.) Loes. in Engl. & Prantl, Nat.

Pflanzenfam. 3(5):207 (1892); Broun & Massey, F.S. :218 (1929).

G. senegalensis var. *inermis* (A. Rich.) Loes. & var. *spinosa* Loes.

in Engl., Bot. Jahrb. 17:541 (1893); Broun & Massey, F.S. :208 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; savanna and upland grassland. *Lynes* s.n. (BM!); *Wickens* 1543, 1923 & 2145.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, the Transvaal, Botswana and SW. Africa; also in the Aldabra Is., northern Madagascar and in southern Spain, Morocco and eastwards through Arabia and Afghanistan to India. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian, Madagascan, Mediterranean and Saho-Sindian Regions.

Olacaceae

325 **Ximenia americana** L., Sp. Pl. :1193 (1753); Oliver, F.T.A. 1:346 (1868); Broun & Massey, F.S. :220 (1929); Andr., F.P.S. 2:290, fig. 104 (1952); Cuf., Enum. :25 (1953); Keay, F.W.T.A. ed. 2, 1:646, fig. 181 (1958); Lucas, F.T.E.A. Olac. :3, fig. 2/1–5 (1968).

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; lowland plain, 1000 m; savanna. *Macintosh* 9; *Aglen* 4; *Francis* 46; *Wickens* 1032, 1289 & 1587; *Kassas* 804 (KHU & CAI, *n.v.*); *Kamil* 1075. Vernacular name: (Fur) *gwee*, pl. *gweenga*, *sohee* or *zoi*; (Arabic) *umm dika*, *umm medeik* or *abu mudeikhi*. Fruit edible, astringent.

DISTRIBUTION Mali to Cameroon and eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and SW. Africa. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Loranthaceae

326 **Tapinanthus globiferus** (A. Rich.) Van Tieghem in Bull. Soc. Bot. Fr. 42:267 (1895); Balle in F.W.T.A. ed. 2, 1:662 (1958); Wickens, For. Bull. 14(N.S.) :17 (1969).

Loranthus globiferus A. Rich., Tent. Fl. Abyss. 1:341 (1847); Sprague in F.T.A. 6(1):352 (1910); Lester-Garland in Journ. Bot. 59:47 (1921); Andr., F.P.S. 2:293, fig. 105 (1952); Cuf., Enum. :28 (1953); Quézel, Dossier 5:119 (1969).

L. globiferus A. Rich. var. *salicifolius* Sprague in F.T.A. 6(1):352 (1910); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :221 (1929); Cuf., Enum. :29 (1953).

L. globiferus A. Rich. var. *verrucosus* Sprague in F.T.A. 6(1):353 (1910); Broun & Massey, F.S. :221 (1929); Cuf., Enum. :29 (1953), pro parte.

[*L. celtidifolius* sensu Broun & Massey, F.S. :222 (1929), *non* Willd. ex Schultes (1829).]

DARFUR Jebel Marra, piedmont and massif, 1160–2200 m; lowland plain, 1020 m; parasitic on *Salix subserrata*, *Acacia albida*, *Cordia abyssinica*, *Ficus sycomorus*, *Gardenia lutea*, *Olea laperrinei*, *Psidium guajava* and *Ziziphus spina-christi*. *Lynes* s.n. (BM!), 71 & 72 (BM!); *Rugman* 5; *Dandy* 36 & 78 (both BM!); *Robertson* 103; *Wickens* 1075, 1254, 1346 & 2953; *Kassas* 330, 359, 360, 9, 467 & 582 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *mumun*; (Arabic) *anab*. The sticky fruits are used as a bird lime. DISTRIBUTION Mali to N. Nigeria eastwards to Ethiopia (and Kenya *fide* F.W.T.A., *n.v.*); also in Arabia. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudanian, Afriental and South Arabian Domains.

327 **Tapinanthus** sp.

DARFUR North of Kas, parasitic on *Ziziphus spina-christi*, 1020 m; *Wickens* 1372. Fruiting material only, fruit 1 cm long, 0–8 cm wide, ovoid, glabrous; persistent calyx 3 mm long.

Rhamnaceae

328 **Ziziphus abyssinica** *Hochst. ex A. Rich.*, Tent. Fl. Abyss. 1:136 (1847); Broun & Massey, F.S. :222 (1929); Andr., F.P.S. 2:300 (1952); Cuf., Enum. :497 (1956); Keay, F.W.T.A. ed. 2, 1:669 (1958); Johnston, F.T.E.A. Rhamn. :27, fig. 8/4 & 9 (1972).

[*Z. jujuba* sensu Hemsley in F.T.A. 1:379 (1868), pro parte, *non* (L.) Gaertn. (1788).]

DARFUR Jebel Marra, piedmont and foothills, 1160–1600 m; lowland plain, 885–1020 m; savanna especially riverine. *Francis* 11 & 34; *Wickens* 1495, 1585 & 1906. Vernacular name: (Fur) *numang buru*; (Arabic) *nabbak el fil*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa, S. & E. Congo, Angola, Rhodesia and Mozambique. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

329 **Ziziphus mauritiana** *Lam.*, Encycl. Méth. Bot. 3:319 (1789); Andr., F.P.S. 2:300 (1952); Cuf., Enum. :498 (1956); Keay, F.W.T.A. ed. 2, 1:668 (1958); Quézel, Dossier 5:119 (1969); Johnston, F.T.E.A. Rhamn. :29, fig. 8/1 (1972).

[*Z. jujuba* sensu Hemsley in F.T.A. 1:379 (1868), pro parte, *non* Gaertn. (1788).]

Z. orthocantha DC., Prodr. 2:21 (1825); Broun & Massey, F.S. :222 (1929).

DARFUR Lowland plain. *Jackson* 2535 (FHO, *n.v.*).

DISTRIBUTION Senegal to Nigeria and eastwards to Ethiopia and Tanzania; naturalized in Zambia, Rhodesia, Malawi and Mozambique according to Drummond, Fl. Zambeziaca 2:420 (1966); also in tropical Asia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

330 **Ziziphus spina-christi** (L.) *Desf.*, Fl. Atlant. 1:201 (1798); Hemsley in F.T.A. 1:380 (1868); Broun & Massey, F.S. :222 (1929); Andr., F.P.S. 2:300, fig. 108 (1952); Cuf., Enum. :499 (1956); Keay, F.W.T.A. ed. 2, 1:669 (1959); Sahni, Trees N. Sudan :82, fig. 35 (1968); Quézel, Dossier 5:119 (1969); Johnston in F.T.E.A. Rhamn. :30, fig. 8/5 (1972).

Rhamnus spina-christi L., Sp. Pl. :195 (1753).

var. **spina-christi**; Johnston, F.T.E.A. Rhamn. :30 (1972).

DARFUR Jebel Marra, piedmont and massif 1160–2300 m; lowland plain, 790–1020 m; riverine and fallow lands. *Jackson* 2536 (FHO, *n.v.*); *Francis* 5 & 35; *Robertson* 101; *Wickens* 1353, 2899 & 2913; *Kassas* 437 & 716 (both KHU! & CAI, *n.v.*). Vernacular name: (Arabic) *nabbak* or *sidr*. Fruit edible. Branches used for brushwood hedges; poles for rough carpentry.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and northern Tanzania; also from Libya and Egypt to Syria and India. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sahelian and Afriental Domains and Saharo-Sindian Region.

Ampelidaceae

331 **Ampelocissus africana** (Lour.) *Merr.* in Trans. Amer. Phil. Soc. N.S., 24:253 (1935); Suessing, in Engl. & Prantl, Nat. Pflanzenfam. ed. 2, 20d:302 (1953); Wickens, For. Bull. 14(N.S.):18 (1969).

Botria africana Lour., Fl. Cochinch. 1:154 (1790).

Vitis asarifolia Baker in F.T.A. 1:396 (1868).

V. grantii Baker in F.T.A. 1:400 (1868).

Ampelocissus asarifolia (Baker) Planchon in La Vigne Amér. 1885:29 (1885); Andr., F.P.S. 2:302 (1952).

A. grantii (Baker) Planchon in La Vigne Amér. 1885:32 (1885); Broun & Massey, F.S. :223 (1929); Keay, F.W.T.A. ed. 2, 1:682 (1958); Cuf., Enum. :504 (1958); Wickens, For. Bull. 14(N.S.):18 (1969).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 750–1020 m; savanna. *Wickens* 1856, 1958 & 2933.

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Botswana, Rhodesia and Mozambique. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

332 **Cayratia gracilis** (Guill. & Perr.) *Suesseng.* in Engl. & Prantl, Nat. Pflanzenfam. ed. 2, 20d:278 (1953).

Cissus gracilis Guill. & Perr., Fl. Seneg. 1:134 (1832); Baker in F.T.A. 1:404 (1868), pro parte, *non* Wall. (1824); Broun & Massey, F.S. :226 (1929); Andr., F.P.S. 2:312 (1952); Keay, F.W.T.A. ed. 2, 1:679 (1958).

[*C. delicatula* sensu Wickens, For. Bull. 14(N.S.):18 (1969), *non* Willems (1956).]

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 2087.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Angola, Natal and the Transvaal. Rare in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

333 **Cissus cornifolia** (Baker) *Planchon* in A. & C. DC., Mon. Phan. 5(2):492 (1887); Broun & Massey, F.S. :224 (1929);

Andr., F.P.S. 2:308 (1952); Keay, F.W.T.A. ed. 2, 1:679 (1958); Cuf., Enum. :507 (1958).

Vitis cornifolia Baker in F.T.A. 1:390 (1868).

DARFUR Jebel Marra, massif, 1830–2300 m; savanna. *Wickens* 1292; *Kassas* 593 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *gulu*.

DISTRIBUTION Ghana to Cameroon and eastwards to Ethiopia and south through E. Africa to Mozambique and the Transvaal. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

334 **Cissus quadrangularis** L., Syst. Nat. ed. 12, 2:124 & Mant. Pl. :39 (1767); Broun & Massey, F.S. :224 (1924); Andr., F.P.S. 2:308, fig. 109 (1952); Keay, F.W.T.A. ed. 2, 1:676 (1958); Cuf., Enum. :511 (1958); Quézel, Dossier 5:119 (1969).

Vitis quadrangularis (L.) Wall. ex Wight & Arn., Prodr. Fl. Pen. Ind. Or. 1:125 (1834); Baker in F.T.A. 1:399 (1868).

DARFUR Jebel Marra, massif, 1780 m; lowland plain, 885–1050 m; savanna. *Wickens* 1616, 1644, 1645b & 1648; *Kassas* 752 & 860 (both KHU & CAI, *n.v.*); *Sahni* 419. Vernacular name: (Fur) *sanam*. The sap is used to poison arrow tips.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Angola, Natal and the Transvaal. Widespread through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

335 **Cyphostemma adenocaulis** (Steud. ex A. Rich.) *Descouings* in Notul. Syst. Paris 16:120 (1960).

Cissus adenocaulis Steud. ex A. Rich., Tent. Fl. Abyss. 1:111 (1847); Broun & Massey, F.S. :225 (1929); Andr., F.P.S. 2:312 (1952); Keay, F.W.T.A. ed. 2, 1:679 (1958); Cuf., Enum. :505 (1958).

Vitis adenocaulis (Steud. ex A. Rich.) Miq., Ann. Mus. Bot. Lugd. Bat. 1:79 (1863); Baker in F.T.A. 1:405 (1868).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; gallery forest and savanna. *Wickens* 1908 & 1975.

DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic and south through E. Africa to Malawi and Mozambique. Widespread in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

336 **Cyphostemma crinita** (Planchon) Descouings in Notul. Syst. Paris 26:120 (1960).
Cissus crinita Planchon in A. & C. DC., Mon. Phan. 5(2):581 (1887); Broun & Massey, F.S. :225 (1929); Andr., F.P.S. 2:311 (1952); Keay, F.W.T.A. ed. 2, 1:680 (1958).
 DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1863.
 DISTRIBUTION N. Nigeria and the southern provinces of the Sudan Republic (Map 91).
 FLORISTIC CATEGORY Sudanian Domain.

337 **Cyphostemma crotalarioides** (Planchon) Descouings in Notul. Syst. Paris 16:121 (1960).
Cissus crotalarioides Planch. in A. & C. DC., Mon. Phan. 5(2):577 (1887); Broun & Massey, F.S. :225 (1929); Andr., F.P.S. 2:309 (1952); Keay, F.W.T.A. ed. 2, 1:680 (1958).
 DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Drar* 2344; *Wickens* 1518 & 1817.
 DISTRIBUTION Dahomey to Cameroon and eastwards to the Sudan Republic and south through Tanzania to Angola, Zambia, Rhodesia, Malawi and Mozambique. Widespread in the southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

338. **Cyphostemma cymosa** (Schum. & Thonn.) Descouings in Notul. Syst. Paris 16:121 (1960).
Cissus cymosa Schum. & Thonn., Beskr. Guin. Pl. :82 (1827); Keay, F.W.T.A. ed. 2, 1:680 (1958).
Vitis thonningii Baker in F.T.A. 1:407 (1868), excl. specim. *Welwitsch*.
Cissus bakerana Planchon in A. & C. DC., Mon. Phan. 5(2):599 (1887).
 DARFUR Jebel Marra, piedmont and massif, 1160–c.1800 m; lowland plain, 1020 m; savanna. *Drar* 2336; *Wickens* 1655 & 1746.
 DISTRIBUTION Senegal to Cameroon and eastwards to the central provinces of the Sudan Republic and Uganda.
 FLORISTIC CATEGORY Sudanian Domain.

339 **Cyphostemma sesquipedalis** (Gilg) Descouings in Notul. Syst. Paris 16:124 (1960).
Cissus sesquipedalis Gilg in Engl., Pflanzenw. Ost-Afr. C: 259 (1895); *Wickens*, For. Bull. 14(N.S.):18 (1969).
C. orondo Gilg & Brandt in Engl., Bot. Jahrb. 46:509, fig. 9 (1912); Cuf., Enum. :509 (1958); **synon. nov.**
Cyphostemma orondo (Gilg & Brandt) Descouings in Notul. Syst. Paris 16:123 (1969); **synon. nov.**
 DARFUR Jebel Marra, piedmont, 1280 m; savanna. *Wickens* 1831.
 Vernacular name: (Fur) *jululeh*.
 DISTRIBUTION Southern provinces of the Sudan Republic, Ethiopia, Uganda, Kenya and northern Tanzania (Map 92).
 FLORISTIC CATEGORY Sudanian and Afriental Domains.

340 **Rhoicissus revoilii** Planchon in A. & C. DC., Mon. Phan. 5(2):469 (1887); Keay, F.W.T.A. ed. 2, 1:681 (1958); Cuf., Enum. :505 (1958); *Wickens*, For. Bull. 14(N.S.):18 (1969).
 DARFUR Jebel Marra massif, 1765 m; gallery forest. *Wickens* 1310 & 1930. Vernacular name: (Fur) *weelgid*.
 DISTRIBUTION Ghana, Sudan Republic (Jebel Marra), Ethiopia, Somali Republic and south through E. Africa to Mozambique and the Transvaal; also in S. Arabia and the Comoros Is.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

341 **Rhoicissus tridentata** (L.f.) Wild & Drummond in Kirkia 3:19 (1963); *Wickens*, For. Bull. 14(N.S.):18 (1969).
Rhus tridentata L. f., Suppl. Pl. :184 (1781).
Vitis erythroides Fresen. in Mus. Senck. 2:284 (1837); Baker in F.T.A. 1:401 (1868).
Rhoicissus erythroides (Fresen.) Planchon in A. & C. DC., Mon. Phan. 5(2):465 (1887); Keay, F.W.T.A. ed. 2, 1:681 (1958).
 DARFUR Jebel Marra, massif, 1350–1765 m; gallery forest. *Wickens* 1575; *Kassas* 255 (KHU & CAI, n.v.).

DISTRIBUTION N. Nigeria (Jos Plateau), Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to the Cape; also in the Yemen.

FLORISTIC CATEGORY Afriental and Zambezian Domains with Sudanian extensions.

Rutaceae

342 **Teclea nobilis** Del. in Ann. Sci. Nat. Paris, II, 20:90 (1843); Oliver, F.T.A. 1:306 (1868); Broun & Massey, F.S. :226 (1929); Andr., F.P.S. 2:317, fig. 114 (1952); Cuf., Enum. :370 (1956).
 DARFUR Jebel Marra, massif, 1765 m; gallery forest. *Wickens* 1317.
 DISTRIBUTION Jebel Marra, Nuba Mountains, Red Sea Hills, and the southern provinces of the Sudan Republic, Ethiopia and south through E. Africa to Malawi and Rhodesia; also in Arabia.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

Burseraceae

343 **Boswellia papyrifera** (Del.) Hochst. in Flora 26:81 (1843); Oliver, F.T.A. 1:323 (1868); Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :229 (1929); Andr., F.P.S. 2:321, fig. 116 (1952); Cuf., Enum. :377 (1956); Sahni, Trees N. Sudan :86, fig. 37 (1968).
Amyris papyrifera Del., Cent. Pl. Voy. Méroë :99 (1826).
 DARFUR Jebel Marra, piedmont and massif, 1070–1830 m; dominant on upper hill slopes. *Lynes* s.n. (BM!); *Francis* 23; *Wickens* 1293. Widespread through the survey area, forming pure stands on the crests of basement complex hills or on stony soils (usually quartz pebbles) of the clay plains. Vernacular name: (Fur) *durrito*; (Arabic) *rut rut* or *tarak tarak*. The resin is reputed to have medicinal properties. The bark is used by the Fur in lieu of paper. Stakes strike readily.
 DISTRIBUTION Central African Republic, the central and southern provinces of the Sudan Republic, Ethiopia and Uganda.
 FLORISTIC CATEGORY Sudanian and Afriental Domains.

344 **Commiphora africana** (A. Rich.) Engl. in A. & C. DC., Mon. Phan. 4:14 (1883); Broun & Massey, F.S. :229 (1929); Andr., F.P.S. 2:323, fig. 117 (1952); Cuf., Enum. :378 (1956); Keay, F.W.T.A. ed. 2, 1:696 (1958); Sahni, Trees N. Sudan :88, fig. 38 (1968); Quézel, Dossier 5:119 (1969).
Heudelotia africana A. Rich. in Guill., Perr. & A. Rich., Fl. Seneg. 1:150 t.39 (1831).
Balsamodendron africanum (A. Rich.) Arn. in Ann. Nat. Hist. 3:87 (1839); Oliver, F.T.A. 1:325 (1868) pro parte, excl. syn.
B. schimperi Berg et vars.
 DARFUR Jebel Marra, foothills, 1200 m; lowland plain, 670–800 m; savanna. *Francis* 47; *Wickens* 1291, 1607 & 2931; *Kamil* 1210. An occasional shrub throughout the basement complex area, especially on the stony hills in association with *Acacia mellifera* to the east and south-east of the Jebel Marra massif. Vernacular name: (Fur) *birri*, pl. *birringa*; (Arabic) *gafal*. The resin is believed to have medicinal properties. The root is sweet and edible. Stakes strike readily.
 DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Transvaal and SW. Africa. Widespread through the central provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

345 **Commiphora pedunculata** (Kotschy & Peyr.) Engl. in A. & C. DC., Mon. Phan. 4:23 (1883); Broun & Massey, F.S. :229 (1929); Andr., F.P.S. 2:323 (1952); Cuf., Enum. :391 (1956); Keay, F.W.T.A. ed. 2, 1:695 (1958).
Balsamodendron pedunculatum Kotschy & Peyr. in Pl. Tinn. :11, t.5B (1867); Oliver, F.T.A. 1:326 (1868).
 DARFUR Lowland plain, 1020 m; hill slopes. *Wickens* 1985.

DISTRIBUTION Senegal to Cameroon and eastwards to the central and southern provinces of the Sudan Republic and Ethiopia.
FLORISTIC CATEGORY Sudanian and Afrotropical Domains.

346 **Commiphora schimperi** (Berg) Engl. in A. & C. DC., Mon. Phan. 4:13 (1883); Cuf., Enum. :393 (1956).
Balsamodendron schimperi Berg in Bot. Zeit. 20:162 (1862).
[*B. africanum* sensu Oliver, F.T.A. 1:325 (1868), pro parte quoad specim. *Schimper*, non Arn. (839).]
DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; degraded savanna. *Francis* 76; *Wickens* 1593 & 2811; *Kassas* 807 (KHU & CAI!). Vernacular name: (Fur) *gerbadut*; (Arabic) *geref ad dut*. No further specimens seen for the Sudan. The first two records have been identified from fruiting material; further collections with leaves, etc. are required for a more positive identification.
DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Somali Republic and south through E. Africa to the Cape.
FLORISTIC CATEGORY Afrotropical and Zambezian Domains.

Meliaceae

347 **Khaya senegalensis** (Desr.) A. Juss. in Mém. Mus. Nat. Hist. Paris 19:250, t.21 (1830); Oliver, F.T.A. 1:338 (1868); Broun & Massey, F.S. :231 (1929); Andr., F.P.S. 2:329, fig. 120 (1952); Cuf., Enum. :398 (1956); Keay, F.W.T.A. ed. 2, 1:698 (1958); Sahni, Trees N. Sudan :90, fig. 39 (1968).
Swietenia senegalensis Desr. in Lam., Encycl. Bot. 3:679 (1791).
DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 925 m; savanna. *Francis* 83; *Wickens* 1584. Vernacular name: (Fur) *buru*; (Arabic) *murraya*. A valuable timber tree.
DISTRIBUTION Senegal to Cameroon and eastwards to the southern provinces of the Sudan Republic and Uganda, cultivated in Ethiopia (Map 93).
FLORISTIC CATEGORY Sudanian Domain.

348 **Pseudocedrela kotschy** (Schweinf.) Harms in Engl., Bot. Jahrb. 22:154 (1895); Broun & Massey, F.S. :231 (1929); Andr., F.P.S. 2:331, fig. 122 (1952); Cuf., Enum. :398 (1956); Keay, F.W.T.A. ed. 2, 1:702 (1958); Sahni, Trees N. Sudan :92, fig. 40 (1968).
Cedrela kotschy Schweinf., Relic. Kotschyanae :36, t.35 (1868).
DARFUR Lowland plain, 120–900 m; riverine woodland. *Wickens* 1641 & 2941. Vernacular name: (Fur) *tololoh*; (Arabic) *ziriziri*.
DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan and Uganda (Map 94).
FLORISTIC CATEGORY Sudanian Domain.

Trichilia emetica Vahl, Symb. Bot. 1:31 (1790); Oliver, F.T.A. 1:335 (1868); Broun & Massey, F.S. :231 (1929); Andr., F.P.S. 2:331, fig. 123 (1952); DeWilde in Meded. Landbouwh. Wagen. 68(2):50 (1968).
The two subspecies recognised by DeWilde may be separated as follows:

Evergreen tree; older, often leafless twigs 3–8 mm diam.
never with a corky bark. subsp. *emetica*
Shrub or small tree, more or less deciduous: older, often leafless twigs stout, 8–20 mm diam., with a soft, corky bark. subsp. *suberosa*

349 subsp. **emetica**; DeWilde in Meded. Landbouwh. Wagen. 68(2):51, fig. 4A, 19C, Map 4 (1968).
T. somalensis Chiov. in Res. Sci. Miss. Stefanini-Paoli Somal. Ital. 1:50 (1916); Cuf., Enum. :402 (1956).
T. roka (Forsk.) Chiov. in Bull. Soc. Bot. Ital. :115 (1923), pro parte; Cuf., Enum. :401 (1956); Wickens, For. Bull. 14(N.S.):19 (1969), *nom. illegit.*
T. jubensis Chiov., Fl. Som. 2:129, t.88 (1932); Cuf., Enum. :401 (1956).
DARFUR Jebel Marra, massif, 1525 m; river bank. *Wickens* 2888.

DISTRIBUTION Central and southern provinces of the Sudan Republic, Ethiopia and the Somali Republic southwards to SW. Africa, Transvaal and Natal; also in the Yemen and Madagascar (possibly introduced) (Map—DeWilde, *l. c.*).
FLORISTIC CATEGORY Sudano-Zambezian Region.

350 subsp. **suberosa** J. DeWilde in Meded. Landbouwh. Wagen. 68(2):67, fig. 4B, Map 4 (1968).
Trichilia roka (Forsk.) Chiov. in Bull. Soc. Bot. Ital. :115 (1923), pro parte; Keay, F.W.T.A. ed. 2, 1:705 (1958), *nom. illegit.*
DARFUR Jebel Marra, massif, 1340 m; *Kamil* 1201.
DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic on the border with the Central African Republic and Uganda. (Map—DeWilde, *l. c.*).
FLORISTIC CATEGORY Sudanian Domain.

Sapindaceae

351 **Cardiospermum halicacabum** L., Sp. Pl. :366 (1753); Baker in F.T.A. 1:417 (1868); Broun & Massey, F.S. :232 (1929); Andr., F.P.S. 2:339, fig. 125 (1952); Cuf., Enum. :490 (1956); Keay, F.W.T.A. ed. 2, 1:711 (1958); Quézel, Dossier 5:120 (1969).
DARFUR Jebel Marra, massif, 1780 m; lowland plain, 1060 m; shade. *Wickens* 1982; *Kassas* 857. (KHU & CAI, *n.v.*). Varietal status not known as no fruits available.
DISTRIBUTION Senegal eastwards to Egypt and the Somali Republic and southwards to the Cape; widespread through the tropics and subtropics. Widely distributed through the Sudan.
FLORISTIC CATEGORY Pantropical.

352 **Paullinia pinnata** L., Sp. Pl. :366 (1753); Baker in F.T.A. 1:419 (1868); Broun & Massey, F.S. :232 (1929); Andr., F.P.S. 2:343, fig. 127 (1952); Cuf., Enum. :489 (1958); Keay, F.W.T.A. ed. 2, 1:710, fig. 196 (1958).
DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; gallery forest and stream bank. *Wickens* 1183 & 1530; *Kassas* 276 & 361 (both KHU & CAI, *n.v.*); *Kamil* 1159.
DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south to Angola, Rhodesia and Mozambique; also Madagascar and tropical America. Widespread in the southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region and Neotropics.

Anacardiaceae

353 **Anacardium occidentale** L., Sp. Pl. :383 (1753); Oliver, F.T.A. 1:443 (1868); Keay, F.W.T.A. ed. 2, 1:727 (1958); Cuf., Enum. :466 (1958).
DARFUR Jebel Marra massif, 1340 m. *Kamil* 1158. A new record for the flora of the Sudan; normally grown under cultivation.
DISTRIBUTION A native of tropical America. The Cashew Tree is now widely cultivated throughout the tropics and sometimes naturalized.
FLORISTIC CATEGORY Pantropical cultigen.

354 **Lannea fruticosa** (Hochst. ex A. Rich.) Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. 1:213 (1897); Andr., F.P.S. 2:346 (1952); Cuf., Enum. :467 (1956); Keay, F.W.T.A. ed. 2, 1:732 (1958); Sahni, Trees N. Sudan :94, fig. 41 (1968).
Odina fruticosa Hochst. ex A. Rich., Tent. Fl. Abyss. 1:141 (1847); Oliver, F.T.A. 1:446 (1868); Broun & Massey, F.S. :234 (1929).
DARFUR Jebel Marra, piedmont and massif, 1060–1780 m; lowland plain, 1020 m; savanna. *Francis* 21, 25, 40, 42 & 69; *Wickens* 964, 1031 & 2753; *Kassas* 357, 765 & 768 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *tebbeh*; (Arabic) *leyun*.
DISTRIBUTION Nigeria and Cameroon eastwards to Ethiopia and Uganda. Widely distributed through the Sudan.
FLORISTIC CATEGORY Sudanian and Afrotropical Domains.

355 **Lannea humilis** (Oliver) Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. 1:213 (1897); Andr., F.P.S. 2:348 (1952); Keay, F.W.T.A. ed. 2, 1:732 (1958).
Odina humilis Oliver, F.T.A. 1:447 (1868); Broun & Massey, F.S. :235 (1929).
 DARFUR Lowland plain, 1010 m; savanna, locally dominant.
Wickens 1511. Vernacular name: (Fur) *tebbeh*; (Arabic) *leyun*.
 DISTRIBUTION Nigeria eastwards to Ethiopia and south through E. Africa to Zambia. Widespread through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

356 **Lannea kerstingii** Engl. & K. Krause in Engl., Bot. Jahrb. 46:325 (1911); Hoyle & Jones in Kew Bull. 2:83 (1947); Andr., F.P.S. 2:348 (1952); Keay, F.W.T.A. ed. 2, 1:732 (1958).
Odina barteri Oliver, F.T.A. 1:446 (1868), pro parte; Broun & Massey, F.S. :235 (1929).
 DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1519 & 1523.
 DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic and Uganda.
 FLORISTIC CATEGORY Sudanian Domain.

357 **Lannea schimperi** (Hochst. ex A. Rich.) Engl. in Engl. & Prantl, Pflanzenfam. Nachtr. 1:213 (1897); Hoyle & Jones in Kew Bull. 2:80 (1947); Andr., F.P.S. 2:346, fig. 129 (1952); Cuf., Enum. :469 (1958); Keay, F.W.T.A. ed. 2, 1:732 (1958).
Odina schimperi Hochst. ex A. Rich., Tent. Fl. Abyss. 1:140 (1847); Oliver, F.T.A. 1:445 (1868); Broun & Massey, F.S. :235 (1929).
 DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna. *Wickens* 1494 & 1538b; *Kassas* 163 & 769 (both KHU & CAI, *n.v.*). Vernacular name: (Fur & Arabic) *kuldos*.
 DISTRIBUTION Nigeria eastwards to Ethiopia and southwards through E. Africa to Zambia. Widespread through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

358 **Ozoroa insignis** Del. in Ann. Sci. Nat. Paris II, 20:91, t.1, fig. 3 (1843); R. Fernandes in Garcia de Orta 14:27 (1966).
Rhus insignis (Del.) Oliver, F.T.A. 1:437 (1868); Broun & Massey, F.S. :234 (1929).
Heeria insignis (Del.) Kuntze, Rev. Gen. 1:152 (1891); Andr., F.P.S. 2:345, fig. 128 (1952); Cuf., Enum. :472 (1958); Keay, F.W.T.A. ed. 2, 1:739 (1958).
 DARFUR Lowland plain, 1130 m; quartz scree. *Wickens* 1371.
 Vernacular name: (Fur & Arabic) *kuldos*. A paste from the leaves and bark is used for skin diseases. The leaves are said to be fatal to donkeys when eaten.
 DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic, also in Arabia. Widespread in the southern provinces of the Sudan, Jebel ed Dair and the Red Sea Hills.
 FLORISTIC CATEGORY Sudanian, Afroriental and South Arabian Domains.

359 **Rhus vulgaris** Meikle in Kew Bull. 6:290 (1951); Andr., F.P.S. 2:349 (1952); Cuf., Enum. :475 (1958); Quézel, Dossier 5-120 (1969).
 [R. *villosa* sensu Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :234 (1929), *non* L.f. (1781).]
 DARFUR Jebel Marra, piedmont and massif, 1160–2525 m; gallery forest and stream bank. *Lynes* s.n., 60 & 98a; *Drar* s.n.; *Jackson* 2630; *Wickens* 1255, 1276, 1308 & 1560; *Kassas* 369, 461, 533, 740 & 751 (all KHU & CAI, *n.v.*); *Kamil* 1085 & 1177. Vernacular name: (Fur) *abung durab* or *jawra*. Fruit edible.
 DISTRIBUTION Central African Republic eastwards to Ethiopia and south through E. Africa to Rhodesia and Mozambique (Map 95). Widely distributed through the southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

360 **Sclerocarya birrea** (A. Rich.) Hochst. in Flora 27, Bes. Beil. 1 (1844); Oliver, F.T.A. 1:449 (1868); Broun & Massey, F.S. :236 (1929); Andr., F.P.S. 2:351, fig. 131 (1952); Cuf., Enum. :467 (1956); Keay, F.W.T.A. ed. 2, 1:729, fig. 199 (1958); Sahn, Trees N. Sudan :96, fig. 42 (1968).
Spondias birrea A. Rich. in Guill. & Perr., Fl. Seneg. 1:152, t.41 (1858).
 DARFUR Jebel Marra, Massif, 1975 m; lowland plain, 900 m; savanna. *Francis* 82; *Wickens* 1294. A common emergent tree on basement complex soils throughout the lowland area, often dominant on eroding soils of *Anogeissus* savanna. Vernacular name: (Fur) *tuwa*, pl. *tuwanga*; (Arabic) *homeid*. The rather acid fruit eaten by cattle, goats and camels; the fruit is laxative. Camels eat the leaves. An infusion of the boiled bark is used for treating labour pains. An oil is extracted from the seeds. The wood is used for manufacturing platters. There is a superstition that the fruit, when eaten, attracts scorpions.
 DISTRIBUTION Senegal to Nigeria and eastwards to Ethiopia, Uganda, Kenya and Tanzania. Widespread through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

Araliaceae

361 **Cussonia arborea** Hochst. ex A. Rich., Tent. Fl. Abyss. 1:336, t.56 (1847); Hiern in F.T.A. 3:31 (1877); Andr., F.P.S. 2:356 (1952); Tennant, F.T.E.A. Araliac. :4, fig. 1 (1968); Cuf., Enum. :636 (1959); Bamps, Fl. Afr. Centr. Araliac. :8, fig. 1 B (1974).
C. barteri Seem. in Journ. Bot. 4:299 (1866); Hiern in F.T.A. 3:32 (1877); Keay, F.W.T.A. ed. 2, 1:750 (1958).
C. hamata Harms in Engl. & Prantl, Pflanzenfam. 3(8):11, fig. 3/K & 53 (1897) & in Engl., Bot. Jahrb. 26:247 (1899); Andr., F.P.S. 2:356 (1952).
C. laciniata Harms in Engl. & Prantl, Pflanzenfam. 3(8):53 (1897) & in Engl., Bot. Jahrb. 26:248 (1899); Andr., F.P.S. 2:356 (1952).
 DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna. *Wickens* 1309, 1541 & 1862; *Kassas* 815 (KHU & CAI, *n.v.*); *Kamil* 1163. Vernacular name: (Fur) *burtu*; (Arabic) *rohse*l or *rotrot*.
 DISTRIBUTION Guinée Republic to Nigeria and eastwards through the southern provinces of the Sudan to Ethiopia and south through E. Africa to Rhodesia and Mozambique (Map 96).
 FLORISTIC CATEGORY Sudano-Zambezian Region.

362 **Polyscias fulva** (Hiern) Harms in Engl. & Prantl, Pflanzenfam. 3(8):45 (1897); Andr., F.P.S. 2:356 (1952); Keay, F.W.T.A. ed. 2, 1:750 (1958); Tennant, F.T.E.A. Araliac. :12, fig. 4/1–5 (1968); Wickens, For. Bull. 14(N.S.) :20 (1969); Bamps, Fl. Afr. Centr. Araliac. :2 (1974).
Panax fulvum Hiern in F.T.A. 3:28 (1877).
P. ferrugineum Hiern in F.T.A. 3:28 (1877).
Polyscias ferruginea (Hiern) Harms in Engl. & Prantl, Pflanzenfam. 3(8):45 (1897); Andr., F.P.S. 2:357 (1952); Cuf., Enum. :636 (1959).
 DARFUR Jebel Marra, massif, 1765 m; gallery forest. *Wickens* 1302 & 1571.
 DISTRIBUTION Upland areas of the Guinée Republic to Cameroon eastwards to the Sudan Republic (Jebel Marra, Imatongs and Didinga Hills) and Ethiopia and south through E. Africa to Rhodesia and Mozambique. (Map 97).
 FLORISTIC CATEGORY Afro-montane.

Umbelliferae

363 **Anethum graveolens** L., Sp. Pl. :263 (1753); Norman in Journ. Bot. 62:137 (1924); Andr., F.P.S. 2:357 (1952); Cuf., Enum. :648 (1959).

Peucedanum graveolens (L.) Hiern in F.T.A. 3:19 (1877); Broun & Massey, F.S. :238 (1929), *non* S. Watson (1871).
 DARFUR Jebel Marra, massif, 1700–2300 m; arable lands; *Lynes* 114; *Kassas* 660 (KHU & CAI, *n.v.*).
 DISTRIBUTION A native of Europe and Western Asia, now widely cultivated. Often grown in the Sudan as a herb (Dill); sometimes occurs as an escape.
 FLORISTIC CATEGORY Mediterranean cultigen.

364 ***Berula erecta*** (Hudson) Coville, Contr. U.S. Nat. Herb. 4:115 (1893); Andr., F.P.S. 2:359 (1952); Cuf., Enum. :646 (1959).

Sum erectum Hudson, Fl. Angl. :103 (1762).
S. angustifolium L., Sp. Pl. ed. 2, :1672 (1763); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :237 (1929).
S. thunbergii DC., Prodr. 4:125 (1830); Hiern in F.T.A. 3:13 (1877); Broun & Massey, F.S. :237 (1929).
 [*Baumiella imbricata* sensu Wickens, For. Bull. 14(N.S.) :20 (1969), *non* (Schinz.) H. Wolff (1927).]
 DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; marshy ground. *Lynes* 34 & 115; *Macintosh* 65; *Dandy* 157 (BM!); *Jackson* 2567; *Robertson* 116; *Wickens* 1102, 1267 & 1712, *Kassas* 402 (KHU & CAI, *n.v.*); *Kamil* 1202.
 DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Uganda, Kenya, Tanzania, Natal, Transvaal and Orange Free State; also in Egypt, Europe, western and central Asia and north America (Map 98).
 FLORISTIC CATEGORY Holarctic with Afro-montane extension.

365 ***Caucalis melanantha*** (Hochst.) Hiern in F.T.A. 3:26 (1877); Cannon in F.W.T.A. ed. 2, :1754 (1958); Cuf., Enum. :640 (1959); Wickens, For. Bull. 14(N.S.) :20 (1969).
Agrocharis melanantha Hochst. in Flora 27:19 (1844).
Torilis melanantha (Hochst.) Vatke in Linnaea 40:190 (1876).
 DARFUR Jebel Marra, massif, 2450–2750 m; upland meadow. *Wickens* 1707 & 2384; *Kassas* 626 (KHU & CAI).
 DISTRIBUTION Upland areas of Cameroon, Sudan Republic (Jebel Marra), Ethiopia, Uganda, Kenya, with an isolated record in the Drakensberg (Map 99); also in the Yemen *vide* Hedberg, Symb. Bot. Upsal. 15(1):135 (1957).
 FLORISTIC CATEGORY Afro-montane (and Afro-alpine).

366 ***Centella asiatica*** (L.) Urban in Mart., Fl. Bras. 11(1):287 t.78, fig. 1 (1878); Andr., F.P.S. 2:360 (1952); Cannon in F.W.T.A. ed. 2, :1753 (1958); Cuf., Enum. :637 (1959).
Hydrocotyle asiatica L., Sp. Pl. :234 (1753); Hiern in F.T.A. 3:6 (1877); Broun & Massey, F.S. :237 (1929).
 DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; river bank. *Wickens* 1478 & 1667.
 DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; also in tropical Asia and Australia. Widespread in the southern provinces of the Sudan.
 FLORISTIC CATEGORY Palaeotropical.

367 ***Coriandrum sativum*** L., Sp. Pl. :256 (1753); Hiern in F.T.A. 3:3 (1877); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :238 (1929); Andr., F.P.S. 2:360 (1952); Cuf. Enum. :640 (1959).
 DARFUR Jebel Marra, massif, 1900–2300 m; fallow lands. *Lynes* 5, 11b & 117; *Dandy* 136 (BM!); *Wickens* 2587; *Kassas* 618 (KHU & CAI, *n.v.*). The plant is cultivated by the Fur, the leaves are used to flavour stews, etc.
 DISTRIBUTION Sudan Republic, Ethiopia, E. Africa southwards to the Cape; also N. Africa, southern Europe and western Asia. A cultivated herb in the Sudan (Coriander), also occurs as an escape from cultivation.
 FLORISTIC CATEGORY Mediterranean cultigen.

368 ***Diplophium africanum*** Turcz. in Bull. Soc. Imp. Nat. Mosc. 201:173 (1847); Norman in Journ. Bot. 62:137 (1924); Andr., F.P.S. 2:301, fig. 133 (1952); Cannon in F.W.T.A. ed. 2, :1755 (1958); Cuf., Enum. :647 (1959).

D. abyssinicum (Hochst. ex A. Rich.) Benth. & Hook.f., Gen. Pl. 1:900 (1867); Hiern in F.T.A. 3:17 (1877); Broun & Massey, F.S. :237 (1929); Cuf., Enum. :647 (1959).
 DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; upland grassland and fallow lands. *Lynes* 113; *Dandy* 176 (BM!); *Robertson* 1; *Pellet* 168; *Wickens* 1029 & 2718; *Kassas* 138 & 166 (both KHU & CAI, *n.v.*); *Kamil* 1079.
 DISTRIBUTION Upland areas of Guinée Republic to Cameroon eastwards to Ethiopia and south to Tanzania (Map 100).
 Widespread in the southern provinces of the Sudan.
 FLORISTIC CATEGORY Afro-montane.

369 ***Ferula communis*** L., Sp. Pl. :246 (1753); Hiern in F.T.A. 3:18 (1877); Norman in Journ. Bot. 62:137 (1924); Cuf., Enum. :648 (1959); Wickens, For. Bull. 14(N.S.) :20 (1969).
F. abyssinica Hochst. ex A. Rich., Tent. Fl. Abyss. 1:326 (1848).
F. sp., Andr., F.P.S. 2:362 (1952).
 DARFUR Jebel Marra, massif 1700–2450 m; upland grassland. *Lynes* 118; *Wickens* 1732 & 2590. Browsed by donkeys. The dry stalks are used for fuel.
 DISTRIBUTION Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia, Uganda, Kenya and Tanzania; also in N. Africa, southern Europe and western Asia. (Map 101).
 FLORISTIC CATEGORY Mediterranean Region with Afro-montane extension.

370 ***Foeniculum vulgare*** Miller, Gard. Dict. ed. 8, No. 1 (1768); Hiern in F.T.A. 3:3 (1877); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :237 (1929); Andr., F.P.S. 2:362, fig. 134 (1952); Cuf., Enum. :647 (1959).
F. officinale All., Fl. Pied. 2:25 (1785); Hiern in F.T.A. 3:3 (1877).
 DARFUR Jebel Marra, massif, 1900–2550 m; lowland plain, 1020 m; arable lands. *Lynes* 31 & 50; *Macintosh* 72; *Wickens* 1143 & 2591; *Kassas* 600 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *birri*; (Arabic) *fezaran ferran* or *shamar*. The leaves are used for culinary purposes.
 DISTRIBUTION Guinée and Sudan Republics, Ethiopia, E. and southern Africa; a native of the Mediterranean region, now widely cultivated. A cultivated herb in the Sudan (Fennel), also occurs as an escape.
 FLORISTIC CATEGORY Mediterranean cultigen.

371 ***Hydrocotyle ranunculoides*** Lf., Suppl. :177 (1781); Cuf., Enum. :637 (1959); Wickens, For. Bull. 14(N.S.) :20 (1969).
H. natans Cyr., Pl. Rar. Neop. :20, t.6B (1788); Hiern in F.T.A. 3:5 (1877); Broun & Massey, F.S. :237 (1929); Andr., F.P.S. 2:363 (1952).
 DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; aquatic. *Wickens* 1535, 1942, 2918 & 2981; *Kassas* 294 & 404 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *kirri*.
 DISTRIBUTION Sudan Republic, Ethiopia and Somalia southwards to Tanzania (Map 102); also known from Italy, Sicily, Sardinia, Palestine, Syria and Iran; widespread in the Americas. Cannon in Fl. Europaea 2:319 (1968) suggests that it is possibly native in Italy although the same author, in Consp. Fl. Angol. 4:337 (1970), suggests that it has possibly been introduced into southern Europe and Africa. Known in the Sudan from the Bahr el Jebel and Bahr el Zeref.
 FLORISTIC CATEGORY Cosmopolitan, status uncertain, possibly of New World origin.

372 ***Steganotaenia araliacea*** Hochst. in Flora 27, Bes. Beil. :4 (1844); Norman in Journ. Linn. Soc. 49:514 (1934); Andr., F.P.S. 2:366, fig. 135 (1952); Cannon in F.W.T.A. ed. 2, :1755 (1958); Cuf., Enum. :650 (1959).
Peucedanum fraxinifolium Hiern ex Oliver in Trans. Linn. Soc. 29:79 (1873); Hiern in F.T.A. 3:22 (1877); Broun & Massey, F.S. :238 (1929).
P. araliaceum (Hochst.) Benth. & Hook.f., Gen. Pl. 1:920 (1876); Hiern in F.T.A. 3:21 (1877).

DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 700m; savanna. *Francis* 48; *Wickens* 969. Vernacular name: (Fur) *boling nom*; (Arabic) *abu asabil* or *assaïy et tulgol*. Browsed by cattle and camels; the twigs are used for toothbrushes.

DISTRIBUTION Mali to Cameroon eastwards to the Somali Republic and south through E. Africa to the Transvaal and SW. Africa (Map 103). Widespread in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

373 ***Torilis arvensis*** (*Hudson*) *Link*, Enum. Pl. Berol. 1:265 (1821); *Andr.*, F.P.S. 2:366 (1952); *Cannon* in F.W.T.A. ed. 2, 1:754 (1958); *Cuf.*, Enum. :639 (1959).

Caucalis arvensis *Hudson*, Fl. Angl. :98 (1762).

Torilis africana (*Thunb.*) *Spreng.*, Pl. Min. Cogn. Pugill. 2:55 (1815).

Caucalis infesta *Curtis*, Fl. Lond. ed. 1, fasc. 3, t.23 (1781); *Hiern* in F.T.A. 3:26 (1877).

DARFUR Jebel Marra, massif, 1350–2300 m; arable weed. *Wickens* 1450 & 2511; *Kassas* 631 & 691 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *kosbar*.

DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia, Uganda, Kenya, Malawi, Rhodesia, Angola and the Cape; also southern and central Europe and N. Africa eastwards into Afghanistan (Map 104).

FLORISTIC CATEGORY Mediterranean with European and Afro-montane extensions, possibly introduced. The complex is badly in need of a thorough revision.

Ericaceae

374 ***Blaeria spicata*** *Hochst. ex A. Rich.*, Tent. Fl. Abyss. 2:13 (1851); *Oliver*, F.T.A. 3:484 (1877), pro parte; *Lester-Garland* in Journ. Bot. 59:47 (1921); *Norman* in Journ. Bot. 62:137 (1924); *Broun & Massey*, F.S. :238 (1929); *Andr.*, F.P.S. 2:366 (1952); *Pichi-Serm. & Heiniger* in *Webbia* 9:36 (1953); *Cuf.*, Enum. :654 (1960); *Wickens* in *Kew Bull.* 27:511 (1972).

subsp. ***spicata***; *Wickens* in *Kew Bull.* 27:513 (1972).

DARFUR Jebel Marra, massif, 2500–3000 m; upland grassland. *Lynes* s.n. (BM!); 56, 56a, 56b (BM!) & 56c; *Rugman* 3; *Sandison* 46 (BM!); *Dandy* 101 (BM!); *Jackson* 2597, 3346 & 3373; *Robertson* 131; *Wickens* 1733 & 2375; *Kassas* 465, 469 & 723 (all KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia.

FLORISTIC CATEGORY Ethiopian-montane.

Ebenaceae

375 ***Diospyros mespiliformis*** *Hochst. ex A. DC.*, Prodr. 8:672 (1844); *Hiern* in F.T.A. 3:518 (1877); *Broun & Massey*, F.S. :239 (1929); *Andr.*, F.P.S. 2:367, fig. 136 (1952); *Cuf.*, Enum. :668 (1960); *F. White* in F.W.T.A. ed. 2, 2:12, fig. 203 (1963); *Sahni*, Trees N. Sudan :98, fig. 43 (1968).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain 800–1130 m; gallery forest and stream banks. *Francis* 59; *Wickens* 1345, 1354, 1370, 1532 & 2938. Vernacular name: (Fur) *fifin* or *dirri*; (Arabic) *gughan*, *jughan* or *jokhan*.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa. Widely distributed through the central and southern provinces of the Sudan, also in the Red Sea Hills.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Myrsinaceae

376 ***Embelia*** sp.

DARFUR Mortagello, a frequent scrambling shrub in gallery forest; 1160 m. *Wickens* 1916.

This is the sole specimen seen for the Sudan. It is within the *E. welwitschii* (*Hiern*) *K. Schum.* complex of species, which is badly in need of revision, although at present insufficiently collected.

377 ***Maesa lanceolata*** *Forsk.*, Fl. Aegypt.-Arab. :cvi & 66 (1775); *Baker* in F.T.A. 3:492 (1877); *Lester-Garland* in Journ. Bot. 59:48 (1921); *Broun & Massey*, F.S. :240 (1929); *Andr.*, F.P.S. 2:377, fig. 141 (1952); *Cuf.*, Enum. :655 (1960); *Hepper*, F.W.T.A. ed. 2, 2:33, fig. 207 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160–2500 m; gallery forest and stream banks. *Lynes* s.n.; *Jackson* 2656 (FHO, *n.v.*); *Wickens* 1056, 1072, 1303, 1307, 1442, 1464 & 2523; *Kassas* 192, 243, 360.5 & 776 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *murra*; (Arabic) *jawra*.

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa. Also known in the Sudan from the Imatongs.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Loganiaceae

The African species of the pantropical genus *Strychnos* have recently received monographic treatment by *Leeuwenberg* (1969). Out of the 75 species recognized for Africa, two (*S. spinosa* and *S. innocua*) may be found in our area. They may be distinguished by the following characters:

<i>S. spinosa</i>	<i>S. innocua</i>
Floral parts 5-merous	Floral parts 4-merous.
Stamens inserted in the tube of the corolla.	Stamens inserted in the mouth of the corolla.
Pistil not conspicuously pilose.	Pistil conspicuously pilose.
Young shoots may or may not be spinose, mature shoots always spinose.	Shoots and branches never spinose.
Fruit with 10–100 seeds.	Fruit with 8–50 seeds.

378 ***Strychnos innocua*** *Del.*, Cen. Pl. Afr. :53 (1826); *Baker* in F.T.A. 4(1):532 (1903); *Broun & Massey*, F.S. :241 (1929); *Andr.*, F.P.S. 2:381 (1952); *Bruce & Lewis*, F.T.E.A. Logan, :25 (1960); *Cuf.*, Enum. :675 (1960); *Onochie & Leeuwenberg* in F.W.T.A. ed. 2, 2:41 (1963); *Leeuwenberg*, Meded. Landbouwh. Wagen. 69(1):138, fig. 20, photo 3, map 21 (1969).

S. xerophila *Baker* in Bull. Misc. Inf. Kew, 1895 :98 (1895) & in F.T.A. 4(1):534 (1903); *Broun & Massey* F.S. :242 (1929). *S. penduliflora* *Baker* in F.T.A. 4(1):531 (1903); *Broun & Massey*, F.S. :241 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; savanna. *Wickens* 1558; *Kamil* 1162. Vernacular name: (Fur) *gurrugu tutu*. Fruit edible.

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola (Map—see *Leeuwenberg, l. c.*). Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

379 ***Strychnos spinosa*** *Lam.*, Illustr. 2:38 (1794); *Baker* in F.T.A. 4(1):536 (1903), excl. *Welwitsch* specim.; *Broun & Massey* F.S. :242 (1929); *Andr.*, F.P.S. 2:383, fig. 143 (1952); *Bruce & Lewis*, F.T.E.A. Logan, :17, fig. 3/13–14 (1960); *Cuf.*, Enum. :676 (1960); *Onochie & Leeuwenberg* in F.W.T.A. ed. 2, 2:41, fig. 209 (1963); *Leeuwenberg*, Meded. Landbouwh. Wagen. 69(1):239, fig. 39 & 40, photo. 4, map. 38 (1969).

S. gracillima *Gilg* in Engl., Bot. Jahrb. 17:573 (1893); *Baker* in F.T.A. 4(1):536 (1903); *Broun & Massey*, F.S. :242 (1929); *Andr.*, F.P.S. 2:383 (1952).

S. spinosa Lam. var. *pubescens* Baker in F.T.A. 4(1):537 (1903); Andr., F.P.S. 2:383 (1952).

S. spinosa Lam. subsp. *lokua* (A. Rich.) Bruce in Kew Bull. 10:42 (1955); Bruce & Lewis, F.T.E.A. Logan. :20 (1960); Cuf., Enum. :676 (1960); Wickens, For. Bull. 14(N.S.) :22 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; lowland plain; 1100 m; savanna. *Lynes* 549; *Wickens* 1107 & 1672; *Kamil* 1073.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in Madagascar, Seychelles and Mauritius, (Map—see Leeuwenberg, *l. c.*). Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

Oleaceae

380 *Jasminum dichotomum* Vahl, Enum. 1:26 (1804); Baker in F.T.A. 4(1):9 (1902); Andr., F.P.S. 2:385 (1952); Turrill, F.T.E.A. Oleac. :23 (1952); Green in F.W.T.A. ed. 2, 2:50 (1963).

J. ternifolium Baker in Bull. Misc. Inf. Kew 1895:95 (1895) & in F.T.A. 4(1):9 (1902); Broun & Massey, F.S. :243 (1929).

DARFUR Jebel Marra, massif, 1765–2010 m; gallery forest, stream bank and upland grassland. *Wickens* 1311 & 1460; *Kassas* 233 & 360:13 (both KHU & CAI, *n.v.*); *Kamil* 1190.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Zambia and Mozambique.

FLORISTIC CATEGORY Sudano-Zambezian Region.

381 *Olea laperrinei* Batt. & Trab. [as *O. laperrini*] in Bull. Soc. Bot. Fr. 58:626 (1911), *nom. nud.* & 58:672 (1911), *descr. gall.*; Maire in Mém. Soc. Hist. Nat. Afr. Nord. No. 3 :168 (1933), *descr. suppl. et lat.*; Wickens, For. Bull. 14(N.S.) :22 (1969); Quézel, Dossier 5:120 (1969).

[*O. chrysophylla* sensu Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :244 (1929); Andr., F.P.S. 2:385 (1952), quoad specim. Jebel Marra, *non* Lam. (1791).]

[*O. europaea* L. var. *nubica* sensu Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :243 (1929), quoad specim. Jebel Marra, *non* Schweinf. ex Baker (1902).]

DARFUR Jebel Marra, massif, 2150–2950 m; upland grassland. *Lynes* s.n. (BM!), 57 & 82a; *Dandy* 192 & 194 (both BM!); *Rugman* 13; *Drar* 2265 (CAI!); *Jackson & Ramsey* 2 & 41; *Wickens* 1264, 1461 and 2687; *Kassas* 466, 473, 548 & 787 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *deili*; (Arabic) *zeitum*. Certain trees are regarded as sacred. The juvenile form of the tree is browsed but the adult tree is apparently not browsed. The wood is used for making throwing sticks.

DISTRIBUTION Saharan mountains of Mouydir, Tassili, Ahaggar and Air, Jebel Marra and its outlier Jebel Gurgeil; also reported from the Atlas Mtns., but no fruiting specimens seen. (Map 106).

FLORISTIC CATEGORY Saharo-montane.

Apocynaceae

382 *Adenium obesum* (Forsk.) Roem. & Schultes, Syst. 4:411 (1819); Broun & Massey, F.S. :247 (1929); Cuf., Enum. :690 (1960); Huber in F.W.T.A. ed. 2, 2:76, fig. 2, 17 (1963); Wickens, For. Bull. 14(N.S.) :22 (1969).

Nerium obesum Forsk., Fl. Aegypt.-Arab. :205 (1775).

Adenium speciosum Fenzl in Sitz. Akad. Wien Math.-Nat. 51:140 (1865); Stapf in F.T.A. 4(1):228 (1902); Broun & Massey, F.S. :247 (1929); Andr., F.P.S. 2:390 (1952); Cuf., Enum. :691 (1960).

A. honghel A. DC., Prodr., 8:412 (1844); Stapf in F.T.A. 4(1):229 (1902); Broun & Massey, F.S. :247 (1929); Andr., F.P.S. 2:389, fig. 145 (1952); Cuf., Enum. :690 (1960).

A. coëtaneum Stapf in F.T.A. 4(1):227 (1902); Andr., F.P.S. 2:390 (1952); Cuf., Enum. :689 (1960).

DARFUR Jebel Marra, massif, 1500 m; savanna. *Wickens* 1285; *Kassas* 729 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *meggeh derreh*; (Arabic) *dumbuzzi*.

DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic and south into Uganda, Kenya and Tanzania; also in Egypt and Arabia. Doubtfully native in W. Africa *vide* Huber *l. c.* (1963). Widespread on the hills of central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian, Afrioriental and South Arabian Domains.

383 *Carissa edulis* Vahl, Symb. Bot. 1:22 (1790); Stapf in F.T.A. 4(1):89 (1902); Broun & Massey, F.S. :245 (1929); Andr., F.P.S. 2:390, fig. 146 (1952); Cuf., Enum. :684 (1960); Huber in F.W.T.A. ed. 2, 2:54 (1963); Quézel, Dossier 5:121 (1969).

DARFUR Jebel Marra, massif, 1350–1765 m; gallery forest and stream banks. *Wickens* 987 & 1312; *Kassas* 254 (KHU & CAI, *n.v.*); *Kamil* 1193. Vernacular name: (Arabic) *ansaar*, *sa'har* or *el fai*.

DISTRIBUTION Mali to Cameroon eastwards to the Somali Republic and south through E. Africa to the Transvaal; also Madagascar, Arabia and SE. Asia. Widespread in the southern provinces of the Sudan and the Red Sea Hills.

FLORISTIC CATEGORY Palaeotropical.

384 *Saba florida* (Benth.) Bullock in Kew Bull. 13:391 (1959); Cuf., Enum. :687 (1960); Huber in F.W.T.A. ed. 2, 2:61 (1963); Wickens, For. Bull. 14(N.S.) :22 (1969).

Landolphia florida Benth. in Hook., Niger Fl. :444 (1849); Stapf in F.T.A. 4(1):38 (1902); Broun & Massey, F.S. :244 (1929); Andr., F.P.S. 2:394 (1952).

L. florida Benth. var. *leiantha* Oliver in Trans. Linn. Soc. 29:107 (1875); Stapf in F.T.A. 4(1):39 (1902); Broun & Massey, F.S. :244 (1929).

L. comorensis K. Schum. in Engl., Bot. Jahrb. 25:402 (1893); Andr., F.P.S. 2:394 (1952).

L. comorensis K. Schum. var. *florida* (Benth.) K. Schum. in Engl., Veget. Uluguru Geb. Sitz. Ber. Akad. Wiss. Berlin 16:195 (1893); Andr., F.P.S. 2:394 (1952).

DARFUR Jebel Marra, piedmont, 1160 m; gallery forest. *Robertson* 110; *Wickens* 1551; *Kamil* 1198.

DISTRIBUTION Mali to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola; also in Madagascar. Widespread in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

Asclepiadaceae

385 *Calotropis procera* (Aiton) Aiton f., Hort. Kew. ed. 2, 2:78 (1811); N. E. Brown in F.T.A. 4(1):294 (1902); Broun & Massey, F.S. :251 (1929); Andr., F.P.S. 2:402, fig. 149 (1952); Cuf., Enum. :702 (1961); Bullock in F.W.T.A. ed. 2, 2:91 (1963); Quézel, Dossier 5:121 (1969).

Asclepias procera Aiton, Hort. Kew. 1:305 (1789).

DARFUR Jebel Marra, massif, 1780 m; fallow lands. *Kassas* 875 (KHU & CAI, *n.v.*). A common shrub of exhausted lands throughout the survey area.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Zambia and Mozambique (Map 107); also from Libya through the Middle East to India and introduced into the West Indies. Widespread throughout the Sudan.

FLORISTIC CATEGORY Saharo-Sindian Region, introduced into other parts of tropical Africa.

386 **Caralluma** sp. aff. *vittata* N.E.Br.

DARFUR Jebel Marra, massif, Kebali, 2450 m and lowland plains, Kalla, 1050 m; a rare succulent herb in rock crevices.

Wickens 2892 & 3004.

DISTRIBUTION Sudan Republic; Darfur and Kordofan Provinces (only known from 6 collections) (Map 108).

FLORISTIC CATEGORY Eastern Sudanian Domain.

Note: The genus is in need of revision. Further collections of living material would be essential for the revision.

387 **Dregea abyssinica** (Hochst.) K. Schum. in Engl., Pflanzenw. Ost-Afr. C:326 (1895); Cuf., Enum. :724 (1961); Bullock in F.W.T.A. ed. 2, 2:97 (1963); Wickens, For. Bull. 14(N.S.):24 (1969).

Pterygocarpus abyssinicus Hochst. in Flora 26:78 (1843).

Marsdenia spissa S. Moore in Journ. Bot. 39:260 (1901); N. E. Brown in F.T.A. 4(1):420 (1903); Broun & Massey, F.S. :254 (1929).

M. abyssinica (Hochst.) Schlechter. in Engl., Bot. Jahrb. 51:143 (1913); Andr., F.P.S. 2:411 (1952).

DARFUR Jebel Marra, piedmont, 1160 m; gallery forest. *Wickens* 1547.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Rhodesia and Angola. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

388 **Dregea rubicunda** K. Schum. in Engl., Bot. Jahrb. 17:147 (1893); Cuf., Enum. :724 (1961).

Marsdenia rubicunda (K. Schum.) N. E. Brown in F.T.A. 4(1):421 (1903); Broun & Massey, F.S. :254 (1929); Andr., F.P.S. 2:411 (1952).

DARFUR Lowland plain; 890 m; *Acacia albida* woodland. *Wickens* 1620.

DISTRIBUTION Central and southern provinces of the Sudan Republic, Ethiopia, Uganda, Kenya and Tanzania.

FLORISTIC CATEGORY Sudano-Zambezian Region.

389 **Gomphocarpus fruticosus** (L.) Aiton f., Hort. Kew. ed. 2, 2:80 (1811); Cuf., Enum. :700 (1960); Bullock in Kew Bull. 7:406 (1952) & in F.W.T.A. ed. 2, 2:92 (1963); Wickens, For. Bull. 14(N.S.):24 (1969).

Asclepias fruticosa L., Sp. Pl. :216 (1753); N. E. Brown in F.T.A. 4(1):330 (1902).

A. phillipsiae N. E. Brown in Bull. Misc. Inf. Kew 1895:219 (1895) & in F.T.A. 4(1):332 (1902); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :253 (1929); Andr., F.P.S. 2:402 (1952); Quézel, Dossier 5:121 (1969).

A. albida N. E. Brown in Bull. Misc. Inf. Kew 1895:254 (1895) & in F.T.A. 4(1):334 (1902).

A. flavida N. E. Brown in Bull. Misc. Inf. Kew 1895:255 (1895) & in F.T.A. 4(1):331 (1902); Broun & Massey, F.S. :252 (1929); Andr., F.P.S. 2:401 (1952).

A. abyssinica (Hochst.) N. E. Brown in F.T.A. 4(1):333 (1902). DARFUR Jebel Marra, massif, 1525–2970 m; upland grassland and fallow lands. *Lynes* 53; *Robertson* 132; *Jackson* 4060; *Wickens* 2135 & 2655; *Kassas* 571 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *barrah*; (Arabic) *sha'lob*.

DISTRIBUTION Guinée Republic and from the Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia and Somali Republic southwards through E. Africa to the Cape (Map 109); also in Madagascar, the Mediterranean region, Canary Is. and Madeira; introduced into Australia.

FLORISTIC CATEGORY Afriental and Zambezian Domains and Madagascar and Mediterranean Regions.

390 **Leptadenia hastata** (Pers.) Decne. in DC., Prodr. 8:551 (1844); Cuf., Enum. :709 (1961); Bullock in F.W.T.A. ed. 2, 2:98 (1963); Wickens, For. Bull. 14(N.S.):24 (1969).

Cynanchum hastatum Pers., Syn. Pl. 1:273 (1805).

Leptadenia lancifolia (Schum. & Thonn.) Decne. in Ann. Sci.

Nat. II, 9:269 (1838); N. E. Brown in F.T.A. 4(1):430 (1903); Broun & Massey, F.S. :254 (1929); Andr., F.P.S. 2:409 (1952); Quézel, Dossier 5:121 (1969).

DARFUR Jebel Marra, massif, 1450 m; lowland plain, 700–1050 m; savanna. *Wickens* 1287, 1649 & 2906. Vernacular name: (Arabic) *salluk*.

DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, Uganda and Kenya. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

391 **Pentarrhinum insipidum** E. Mey., Comm. Pl. Afr.

Austr. :200 (1837); N. E. Brown in F.T.A. 4(1):378 (1902); Andr., F.P.S. 2:412 (1952); Cuf., Enum. :703 (1960); Bullock in F.W.T.A. ed. 2, 2:90 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160–2050 m; fallow lands. *Dandy* 145 & 184 (both BM!); *Drar* 2197 (CAI!); *Jackson* 3315; *Wickens* 2181.

DISTRIBUTION S. Nigeria, Cameroon, Sudan Republic (Jebel Marra), Ethiopia and Somali Republic south through E. Africa to the Cape.

FLORISTIC CATEGORY Sudano-Zambezian Region.

392 **Pergularia daemia** (Forsk.) Chiov., Res. Sci. Miss. Stefan-

Paoli Somal. Ital. 1:115 (1916); Andr., F.P.S. 2:413 (1952); Cuf., Enum. :725 (1961); Bullock in F.W.T.A. ed. 2, 2:90 (1963). *Asclepias daemia* Forsk., Fl. Aegypt.-Arab. :51 (1775).

Daemia extensa R.Br. in Mem. Wern. Soc. 1:50 (1810); N. E. Brown in F.T.A. 4(1):387 (1903); Broun & Massey, F.S. :254 (1929).

DARFUR Lowland plain, 900–1100 m; *Acacia mellifera* scrub. *Lynes* 567; *Wickens* 1374.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also from Arabia across to India and Ceylon. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian, Saharo-Sindian and Deccan Regions.

393 **Sarcostemma viminale** (L.) R.Br. in Mem. Wern. Soc.

1:51 (1810); N. E. Brown in F.T.A. 4(1):384 (1902); Broun & Massey, F.S. :253 (1929); Andr., F.P.S. 2:416, fig. 154 (1952); Cuf., Enum. :707 (1960); Bullock in F.W.T.A. ed. 2, 2:93 (1963); Wickens, For. Bull. 14(N.S.):25 (1969); Quézel, Dossier 5:122 (1969).

Euphorbia viminalis L., Sp. Pl. :452 (1753).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; rock crevices. *Macintosh* 119; *Wickens* 1493 & 1693; *Kassas* 757 & 868 (both KHU & CAI, *n.v.*).

DISTRIBUTION Ghana and Nigeria eastwards to Ethiopia and south through E. Africa to the Cape; also in Egypt, Arabia and Madagascar. Widespread in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

394 **Stathmostelma pedunculatum** (Decne.) K. Schum. in

Engl., Bot. Jahrb. 17:132 (1893); Cuf., Enum. :703 (1960). *Gomphocarpus pedunculatus* Decne. in DC., Prodr. 8:558 (1844).

Asclepias macrantha Hochst. ex Decne. in DC., Prodr. 8:558 (1844); N. E. Brown in F.T.A. 4(1):340 (1902); Broun & Massey, F.S. :253 (1929).

A. pedunculata (Decne.) Dandy ex F.W. Andr., F.P.S. 2:401 (1952).

DARFUR Lowland plain, 1000 m; savanna. *Wickens* 2008. Vernacular name: (Arabic) *sha'lob*.

DISTRIBUTION Southern provinces of the Sudan Republic, Ethiopia, Uganda, Kenya, Tanzania, Zambia and Mozambique.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Rubiaceae

395 **Adina microcephala** (*Del.*) *Hiern* in F.T.A. 3:40 (1877); Broun & Massey, F.S. :257 (1929); Andr., F.P.S. 2:423, fig. 156 (1952); Hepper in F.W.T.A. ed. 2, 2:163 (1963); Cuf., Enum. :998 (1965).

Nauclea microcephala Del., Cent. Pl. Méroé :67 (1826).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; gallery forest. *Wickens* 1533; *Kassas* 340 (KHU & CAI, *n.v.*); *Kamil* 1199.

DISTRIBUTION Mali to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and Angola; also in Madagascar. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

396 **Anthospermum pachyrrhizum** *Hiern* in F.T.A. 3:229 (1877); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :261 (1929); Andr., F.P.S. 2:425 (1952); Cuf., Enum. :1020 (1965); Quétel, Dossier 5:122 (1969).

DARFUR Jebel Marra, massif, 1900–3000 m; upland grassland. *Lynes* s.n. (BM!), 147b & 150; *Sandison* 58, 59 & 60 (all BM!); *Jackson* 2655; *Robertson* 127; *Wickens* 1734; *Kassas* 405, 461:32; 488 & 541 (all KHU & CAI, *n.v.*); *Sahni* 435.

DISTRIBUTION Sudan Republic (Jebel Marra and its outlier Jebel Gurgeil) and Ethiopia (Map 110).

FLORISTIC CATEGORY Ethiopian-montane.

397 **Arbulocarpus sphaerostigma** (*A. Rich.*) *Tennant*¹ in Kew Bull. 12:386 (1958); Cuf., Enum. :1023 (1965).

Hypodematum sphaerostigma A. Rich., Tent. Fl. Abyss. 1:348

(1847); *Hiern* in F.T.A. 3:240 (1877); Andr., F.P.S. 2:441 (1952).

Spermacoe sphaerostigma (A. Rich.) Oliver in Trans. Linn. Soc. 29:88 (1873); Broun & Massey, F.S. :273 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–1340 m; lowland plain, 1020 m; fallow lands and stony scree. *Wickens* 2097, 2189, 2205 & 2509.

DISTRIBUTION N. Nigeria (Jos Plateau), Cameroon, central and southern provinces of the Sudan Republic, Ethiopia, Uganda, Kenya and Tanzania.

FLORISTIC CATEGORY Sudano-Zambezian Region.

398 **Borreria chaetocephala** (*DC.*) *Hepper*² in Kew Bull. 14:256 (1960) & F.W.T.A. ed. 2, 2:220 (1963); Cuf., Enum. :1021 (1965).

Spermacoe chaetocephala DC., Prodr. 4:554 (1830).

var. **chaetocephala**; Hepper in *l. c.* (1960) & F.W.T.A. ed. 2, 2:220 (1963); Cuf., Enum. :1021 (1965); Wickens, For. Bull. 14(N.S.) :25 (1969).

Borreria hebecarpa Hochst. ex A. Rich., Tent. Fl. Abyss. 1:347 (1848), pro parte; Andr., F.P.S. 2:427 (1952).

Spermacoe kotschyana Oliver in Trans. Linn. Soc. 29:88, t.53 (1873); Broun & Massey, F.S. :273 (1929).

S. hebecarpa (Hochst. ex A. Rich.) Oliver, (*non* DC. (1830))

var. *major* Schweinf. ex *Hiern* in F.T.A. 3:237 (1877); Broun & Massey, F.S. :272 (1929).

Borreria kotschyana (Oliver) K. Schum. in Engl., Pflanzenw.

Ost-Afr. C:394 (1895); Andr., F.P.S. 2:428 (1952).

DARFUR Jebel Marra, foothill; 1130 m; savanna. *Wickens* 2240.

DISTRIBUTION Senegal, Mali, N. Nigeria and Cameroon eastwards to Ethiopia and south through E. Africa to Zambia and Rhodesia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

399 **Fadogia cienkowski** *Schweinf.*, Reliq. Kotsch. :47, t.32 (1868); *Hiern* in F.T.A. 3:154 (1877); Robyns, Tent. Monog. Vang. :79 (1928); Broun & Massey, F.S. :268 (1929); Andr., F.P.S. 2:434 (1952); Hepper, F.W.T.A. ed. 2, 2:178 (1963); Cuf., Enum. :1012 (1965).

Fadogia agrestis Schweinf. ex *Hiern* in F.T.A. 3:154 (1877);

Robyns, Tent. Monog. Vang. :92 (1928); Broun & Massey, F.S.

:268 (1929); Andr., F.P.S. 2:434 (1952); **synon. nov.**

DARFUR Jebel Marra, massif, 1525 m; fallow lands. *Wickens* 2136.

DISTRIBUTION Mali to Cameroon eastwards to the southern provinces of the Sudan Republic (also in the central provinces *fide* Andr., *l. c.* but no specimens seen at Kew), and south through E. Africa to the Transvaal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

400 **Feretia apodanthera** *Del.* in Ann. Sci. Nat. II, 20:92, t.1, 4 (1843); *Hiern* in F.T.A. 3:115 (1877); Broun & Massey, F.S. :265 (1929); Andr., F.P.S. 2:434 (1952); Keay in F.W.T.A. ed. 2, 2:147, fig. 230 (1963); Cuf., Enum. :1004 (1965).

DARFUR Lowland plain, 850–900 m; savanna. *Wickens* 1645a & 1647; *Kamil* 1207.

DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia, Uganda and Kenya. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afrioriental Domains.

401 **Galium spurium** *L.*, Sp. Pl. :106 (1753).

var. **echinospermum** (*Waltr.*) *Desportes*¹, Fl. Maine :118 (1838).

G. agreste Waltr. var. *echinospermum* Waltr., Sched. Crit. :59 (1822).

[*G. aparine* sensu *Hiern* in F.T.A. 3:245 (1877); Broun & Massey, F.S. :274 (1929); Andr., F.P.S. 2:435 (1952); Cuf., Enum.

:1024 (1965), *non* L. (1753).]

G. sp. sensu Norman in Journ. Bot. 62:138 (1924).

DARFUR Jebel Marra, piedmont and massif, 1160–2650 m; arable lands, gallery forest, stream banks and upland meadow. *Lynes* 125 (BM!); *Wickens* 1445, 1681, 1857, 2156, 2386, 2465, 2516, 2863 & 2671.

DISTRIBUTION Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia, Uganda, Kenya, Tanzania and Malawi and from the Transvaal to the Cape; widely distributed through the world.

FLORISTIC CATEGORY Subcosmopolitan weed.

402 **Galium thunbergianum** *Ecklon & Zeyher*², Enum. :369

(1837); Hepper, F.W.T.A. ed. 2, 2:223 (1963); Cuf., Enum.

:1026 (1965); Wickens, For. Bull. 14(N.S.) :26 (1969).

G. dasycarpum Hochst. ex Schweinf., Beitr. Fl. Aethiop. :135

(1867); Andr., F.P.S. 2:435 (1952).

G. biafrae *Hiern* in F.T.A. 3:245 (1877).

[*G. rotundifolium* sensu Norman in Journ. Bot. 62:138 (1924);

Broun & Massey, F.S. :274 (1929), *non* L. (1753).]

DARFUR Jebel Marra, massif, 2580–2800 m; upland grassland.

Lynes 124 (BM!); *Robertson* 155; *Wickens* 1731.

DISTRIBUTION Uplands of Cameroon, Sudan (Jebel Marra), Uganda, Kenya, Tanzania, Rhodesia, Natal, Transvaal and the Cape (Map 111).

FLORISTIC CATEGORY Afro-montane.

403 **Gardenia lutea** *Fresen.* in Mus. Senck. 2:167 (1837);

Broun & Massey, F.S. :263 (1929); Andr., F.P.S. 2:438, fig. 157

(1952); Keay in F.W.T.A. ed. 2, 2:123 (1963); Cuf., Enum.

:1002 (1965).

[*G. thunbergia* sensu *Hiern* in F.T.A. 3:100 (1877), pro parte, *non* L.f. (1781).]

DARFUR Jebel Marra, piedmont and massif, 1160–1525 m; lowland plain, 950 m; savanna. *Francis* 18, 50 & 58; *Wickens* 1092, 1907, 1559, 1586 & 1592. Vernacular name: (Fur) *wunang dawrah*; (Arabic) *abu gaw*. Fruit edible.

DISTRIBUTION Cameroon, central and southern provinces of the Sudan Republic and Ethiopia south through E. Africa to Zambia.

(1) See note 1, p. 191.

(2) See note 2, p. 191.

(1) See note 3, p. 191.

(2) See note 4, p. 191.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Note: The genus is in need of a critical revision.

404 **Kohautia caespitosa** Schnizlein in Flora 25, Beibl. 1:145 (1842); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):104 (1952); Cuf., Enum. :986 (1965); Wickens, For. Bull. 14(N.S.) :27 (1969).

Oldenlandia schimperi (C. Presl) T. Anders. in Journ. Linn. Soc. 5, Suppl. 1:21 (1860); Hiern in F.T.A. 3:55 (1877); Broun & Massey, F.S. :259 (1929); Andr., F.P.S. 2:449, fig. 162 (1952). DARFUR Jebel Marra, massif, 1340 m; arable lands. Wickens 1200. DISTRIBUTION Sudan Republic (Jebel Marra and Red Sea Hills) and Ethiopia southwards through E. Africa to the Cape; also in Egypt and Arabia.

FLORISTIC CATEGORY Afriental, South Arabian and Zambezian Domains.

405 **Kohautia coccinea** Royle, Ill. Himal. :241, t.53, fig. 1 (1839); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):82 (1952); Hepper, F.W.T.A. ed. 2, 2:210 (1963); Cuf., Enum. :988 (1965); Wickens, For. Bull. 14(N.S.) :26 (1969).

Oldenlandia abyssinica (Hochst. ex A. Rich.) Hiern in F.T.A. 3:57 (1877).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; upland grassland and fallow lands. Robertson 14; Jackson 4048; Pettet J.173; Wickens 1658, 1695, 2421, 2453, 2502 & 2635. Sole records seen for the Sudan.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique and Rhodesia; also in NW. India.

FLORISTIC CATEGORY Sudano-Zambezian Region.

406 **Kohautia grandiflora** DC., Prodr. 4:430 (1830); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):88 (1952); Hepper F.W.T.A. ed. 2, 2:210, fig. 244 (1963); Cuf., Enum. :988 (1965); Wickens, For. Bull. 14(N.S.) :27 (1969).

Oldenlandia grandiflora (DC.) Hiern in F.T.A. 3:57 (1877); Broun & Massey, F.S. :258 (1929); Andr., F.P.S. 2:451, fig. 163 (1952).

DARFUR Lowland plain, 1020 m; waste places. Wickens 2751. DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and Uganda. Widely distributed through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

407 **Kohautia senegalensis** Cham. & Schlechter in Linnaea 4:156 (1829); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):92 (1952); Hepper, F.W.T.A. ed. 2, 2:209 (1963); Cuf., Enum. :989 (1965); Wickens, For. Bull. 14(N.S.) :27 (1969).

Oldenlandia senegalensis (Cham. & Schlechter) Hiern in F.T.A. 3:56 (1877); Broun & Massey, F.S. :259 (1929); Andr., F.P.S. 2:449 (1952); Quézel, Dossier 5:122 (1969).

O. noctiflora Hiern in F.T.A. 3:57 (1877); Broun & Massey, F.S. :261 (1929); Andr., F.P.S. 2:450 (1952).

DARFUR Lowland plain, 1020 m; fallow lands. Wickens 2798. DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic; also in the Yemen. Widespread through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudanian, Afriental and South Arabian Domains.

408 **Mitracarpus scaber** Zucc.¹ in Schultes, Mant. :210 & 399 (1827); Hiern in F.T.A. 3:243 (1877); Broun & Massey, F.S. :273 (1929); Andr., F.P.S. 2:443 (1952); Hepper, F.W.T.A. ed. 2, 2:222 (1963); Cuf., Enum. :1023 (1965); Quézel, Dossier 5:122 (1969).

DARFUR Lowland plain, 1020 m; arable weed. Lynes 566; Wickens 1156 & 1753b.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

409 **Mitragyna inermis** (Willd.) Kuntze, Rev. Gen. 1:288 (1891); Andr., F.P.S. 2:443 (1952); Hepper, F.W.T.A. ed. 2, 2:161 (1963).

Uncaria inermis Willd. in Usteri Delect. 2:199 t.3 (1793).

Mitragyna africana (Willd.) Korth., Obs. Nacl. Ind. :19 (1839); Hiern in F.T.A. 3:40 (1877); Broun & Massey, F.S. :257 (1929). DARFUR Lowland plain, 600–760 m; swamp fringes. Robertson 107; Wickens 1629.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan (Map 112).

FLORISTIC CATEGORY Guinea and Sudanian Domains.

410 **Mussaenda arcuata** Lam. ex Poir. in Lam., Encycl. Méth. Bot. 4:392 (1797); Hiern in F.T.A. 3:68 (1877); Broun & Massey, F.S. :261 (1929); Andr., F.P.S. 2:446 (1952); Hepper, F.W.T.A. ed. 2, 2:165 (1963).

DARFUR Jebel Marra, massif, 1350 m; Kassas 245 (KHU & CAI!).

DISTRIBUTION Guinée Republic eastwards to Ethiopia and south to Angola, Zambia, Rhodesia and Mozambique; also in Madagascar, Mascarenes and Mauritius (Map 113). Widely distributed in the southern provinces of the Sudan.

FLORISTIC CATEGORY Guineo-Congo and Madagascan Regions with Sudano-Zambezian extensions.

411 **Oldenlandia corymbosa** L., Sp. Pl. :119 (1753); Hiern in F.T.A. 3:62 (1877); Broun & Massey, F.S. :260 (1929); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):254 (1952); Andr., F.P.S. 2:453 (1952); Hepper, F.W.T.A. ed. 2, 2:211 (1963); Cuf., Enum. :983 (1965).

DARFUR Lowland plain, 1020 m; arable weed. Wickens 1161 & 2043.

DISTRIBUTION Senegal to Cameroon eastwards to the Sudan Republic (Ethiopia *vide* Cuf., l. c.) and south through E. Africa to the Transvaal; widespread in the tropics and subtropics. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Pantropical weed.

412 **Oldenlandia echinulosa** K. Schum.¹ in Engl., Pflanzenw. Ost-Afr. C:375 (1895); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):213 (1952); Hepper, F.W.T.A. ed. 2, 2:211 (1963); Wickens, For. Bull. 14(N.S.) :27 (1969).

DARFUR Jebel Marra, massif, 1350 m; moist boulders. Wickens 2515a.

DISTRIBUTION Uplands of Sierra Leone, Nigeria, Cameroon, Congo and Sudan Republic (Jebel Marra), Tanzania, Malawi, Rhodesia and Angola (Map 114).

FLORISTIC CATEGORY Afro-montane.

413 **Oldenlandia herbacea** (L.) Roxb., Hort. Bengal. :11 (1814); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):244 (1952); Andr., F.P.S. 2:451 (1952); Hepper, F.W.T.A. ed. 2, 2:212 (1963); Cuf., Enum. :984 (1965); Quézel, Dossier 5:122 (1969).

Hedyotis herbacea L., Sp. Pl. :102 (1753).

Oldenlandia heynii (R.Br.) G. Don, Gen. Syst. 3:531 (1834); Hiern in F.T.A. 3:59 (1877); Broun & Massey, F.S. :260 (1929).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1050 m; rock crevices and arable lands. Wickens 1694, 2329 & 2760.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in Egypt and tropical and subtropical Asia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical weed.

414 **Pavetta hochstetteri** Bremekamp in Fedde Rep. 37:182 (1934); Cuf., Enum. :1015 (1965).

var. **glaberrima** Bremekamp in Fedde Rep. 37:182 (1934); Andr., F.P.S. 2:458 (1952); Wickens, For. Bull. 14(N.S.) :27 (1969).

[*P. gardeniifolia* sensu Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :269 (1929), *non* Hochst. ex A. Rich. (1848).]

(1) See note 5, p. 191.

(1) See note 6, p. 191.

DARFUR Jebel Marra, massif, 2050 m; lowland plain, 1050 m; scree slopes. *Lynes* 128; *Wickens* 1981.

DISTRIBUTION Sudan Republic and Ethiopia. Widely distributed in the Nuba Mountains, Red Sea Hills and southern provinces of the Sudan.

FLORISTIC CATEGORY Eastern Sudanian and Afriental Domains.

415 **Pentodon pentandrus** (*Schum. & Thonn.*) *Valke* in Oest. Bot. Zeit. 25:231 (1875); Bremekamp, Verh. Acad. Wet. Nat. sect. 2, 48(2):176 (1952); Hepper, F.W.T.A. ed. 2, 2:213 (1963); Cuf., Enum. :993 (1965); Wickens, For. Bull. 14(N.S.) :27 (1969). *Hedyotis pentandra* Schum. & Thonn., Beskr. Guin. Pl. :71 (1827). *Oldenlandia macrophylla* DC., Prodr. 4:427 (1830); Hiern in F.T.A. 3:63 (1877); Broun & Massey, F.S. :259 (1929); Andr., F.P.S. 2:454 (1952).

DARFUR Jebel Marra, piedmont, 1160 m; marsh. *Wickens* 1665.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and SW. Africa; also in the Yemen and Madagascar. Present in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

416 **Vangueria venosa** *Hochst. ex Del.* in Ferret & Galinier, Voy. Abyss. 3:140 (1847); Robyns, Tent. Monog. Vang. :290 (1928); Broun & Massey, F.S. :267 (1929); Andr., F.P.S. 2:466 (1952); Hepper, F.W.T.A. ed. 2, 2:187 (1963); Quézel, Dossier 5:122 (1969).

[*V. edulis* sensu Hiern in F.T.A. 3:148 (1877), *non* Vahl (1794).]

DARFUR Jebel Marra, piedmont and massif, 1160–1800 m; lowland plain, 1280 m; gallery forest and stream banks. *Wickens* 1808, 1905, 1970 & 2817; *Kassas* 373 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *munjawa* or *gawon*; (Arabic) *angata* or *inderab*. Fruit edible.

DISTRIBUTION Mali, Ghana, Nigeria, central and southern provinces of the Sudan Republic, Ethiopia and Uganda.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

417 **Vangueria** sp. aff. **linearisepala** *K. Schum.* in Engl., Bot. Jahrb. 33:351 (1903).

DARFUR Jebel Marra, foothills, Kibi to Guldo road, 1130 m; occasional small tree by stream banks, *Anogeissus* savanna. *Wickens* :2250.

More material is required in order to determine whether this species is conspecific with *V. linearisepala* from Ethiopia and E. Africa.

418 **Xeromphis nilotica** (*Stapf*) *Keay* in Bull. Jard. Bot. Brux. 28:39 (1958) & in F.W.T.A. ed. 2, 2:121 (1963); Cuf., Enum. :1001 (1965); Wickens, For. Bull. 14(N.S.) :28 (1969).

Randia nilotica Stapf in Journ. Linn. Soc. Bot. 37:519 (1906); Broun & Massey, F.S. :262 (1929).

Lachnosiphonium niloticum (Stapf) Dandy ex F.W. Andr., F.P.S. 2:441, fig. 159 (1952).

[*Randia dumentorum* sensu Hiern in F.T.A. 3:94 (1877), *non* (Retz.) Lam. (1792).]

DARFUR Lowland plain, 1020 m; stream banks. *Wickens* 1344 & 1803. Vernacular name: (Fur) *numan boge*.

DISTRIBUTION Guinée Republic, N. Nigeria and Cameroon eastwards to Ethiopia, Uganda, Kenya and Tanzania. Widespread in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1020 m; arable lands and waste places. *Jackson* 3318 & 4012; *Wickens* 1033, 1337 & 1383; *Kassas* 743 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *kamel bouli*; (Arabic) *horeib gamel*, *horeib hausa* or *khara hausa*. The younger foliage is lightly browsed by goats. A serious weed of cultivation and waste places. The Resident, Geneina, first drew attention to the presence of this weed in 1953. Its introduction into Darfur from W. Africa was probably slightly earlier. By 1959 it had reached El Obeid. It is now widely distributed through the northern and central provinces.

DISTRIBUTION Widespread throughout tropical and subtropical Africa, introduced from tropical America.

FLORISTIC CATEGORY Neotropical, now a pantropical weed.

420 **Adenostemma cafferum** DC., Prodr. 5:112 (1836); Andr., F.P.S. 3:8 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:286 (1963); Cuf., Enum. :1078 (1966).

[*A. viscosum* sensu Oliver & Hiern in F.T.A. 3:299 (1877); Broun & Massey, F.S. :279 (1929), pro parte, *non* J. R. & G. Forster (1776).]

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; marshy ground. *Lynes* 168a (BM!); *Dandy* 155 (BM!); *Jackson* 3380; *Wickens* 1186 & 1454; *Kassas* 189, 244, 294:4, 364, 511, 658, 758 & 851 (KHU & CAI, *n.v.*).

DISTRIBUTION Mali to Cameroon eastwards to the southern provinces of the Sudan Republic (Ethiopia *fide* Cuf., *l. c.*), and south through E. Africa to Natal and the Transvaal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

421 **Anisopappus africanus** (*Hook.f.*) *Oliver & Hiern* in F.T.A. 3:369 (1877); Broun & Massey, F.S. :287 (1929); Andr., F.P.S. 3:9 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:258, fig. 255 (1963).

Telekia africana Hook.f. in Journ. Linn. Soc. 7:201 (1864).

DARFUR Jebel Marra, massif, 1350 m. *Kassas* 293:21 (KHU & CAI!).

DISTRIBUTION Ghana to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi, Zambia and Angola. Widely distributed in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

422 **Aspilia ciliata** (*Schumacher*) *Wild* in Kirkia 6:41 (1967); Cuf., Enum. :1128 (1967); Wickens, For. Bull. 14(N.S.) :28 (1969).

Verbesina ciliata Schum. in Schum. & Thonn., Beskr. Guin. Pl. :391 (1827).

Blainvillea prieuriana DC., Prodr. 5:492 (1836); Oliver & Hiern in F.T.A. 3:375 (1877); Broun & Massey, F.S. :288 (1929); Andr., F.P.S. 3:13 (1956).

Aspilia helianthoides (Schum. & Thonn.) Oliver & Hiern subsp. *ciliata* (Schum.) C. D. Adams in Webbia 12:245 (1956) & in F.W.T.A. ed. 2, 2:239 (1963).

A. helianthoides (Schum. & Thonn.) Oliver & Hiern subsp. *prieuriana* (DC.) C. D. Adams in Webbia 12:246 (1956) & in F.W.T.A. ed. 2, 2:239 (1963); Wickens, For. Bull. 14(N.S.) :28 (1969); Quézel, Dossier 5:123 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; lowland plain 1100 m; shady places. *Lynes* 607; *Wickens* 2330, 2517 & 2572.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Zambia. Widely distributed through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

423 **Aspilia kotschy** (*Schultz Bip. ex Hochst.*) *Oliver* in Trans. Linn. Soc. Bot. 29:98 (1873); Oliver & Hiern in F.T.A. 3:381 (1877); Broun & Massey, F.S. :289 (1929); Andr., F.P.S. 3:10 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:239 (1963); Cuf., Enum. :1129 (1967); Quézel, Dossier 5:123 (1969). var. **kotschy**; C. D. Adams in Webbia 12:241 (1956) & in F.W.T.A. ed. 2, 2:239 (1963); Wickens, For. Bull. 14(N.S.) :28 (1969), excl. specim. *Wickens* 2517 & 2572.

Compositae

419 **Acanthospermum hispidum** DC., Prodr. 5:522 (1836); C. D. Adams in F.W.T.A. ed. 2, 2:241 (1963); Wickens, For. Bull. 14(N.S.) :28 (1969); Quézel, Dossier 5:122 (1969).

Depterotheca kotschyi Schultz Bip. ex Hochst. in Flora 25:435 (1842). DARFUR Jebel Marra, massif, 1340 m; lowland plain, 1020–1100 m; savanna. *Lynes* 606 & 607; *Wickens* 1563, 2075 & 2314; *Kassas* 176 (KHU & CAI, *n.v.*).
DISTRIBUTION Senegal to Cameroon eastwards to the Sudan Republic and southwards through E. Africa to Mozambique, Rhodesia and Angola. Widely distributed through the southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

424 ***Bidens bipinnata* L.**, Sp. Pl. :832 (1753); Oliver & Hiern in F.T.A. 3:393 (1877); Broun & Massey, F.S. :291 (1929); Sherff in Publ. Field Mus. 16:366, t.89 (1937); Andr., F.P.S. 3:12 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:234 (1963); Cuf., Enum. :1135 (1967).
B. pilosa L. var. *bipinnata* (L.) Hook., Fl. Brit. Ind. 3:309 (1881). DARFUR Jebel Marra, massif, 1780 m; lowland plain, 1020 m; arable land and waste places. *Wickens* 1699 & 2352. Vernacular name: (Fur) *daou*.
DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal; widespread in the tropics and subtropics. Widely distributed through the central provinces of the Sudan.
FLORISTIC CATEGORY Pantropical.

425 ***Bidens biternata* (Lour.) Merrill & Sherff** in Bot. Gaz. 88:293 (1929); Sherff in Publ. Field Mus. 16:388, t.99 (1937); Andr., F.P.S. 3:12 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:234 (1963); Cuf., Enum. :508 (1967); Quézel, Dossier 5:123 (1969).
Coreopsis biternata Lour., Fl. Coch. :508 (1790).
var. ***glabrata* (Vatke) Sherff** forma ***abyssinica* (Sch. Bip.) Sherff** in Bot. Gaz. 90:389 (1930).
B. abyssinica Schultz Bip. in Walp., Repert. 6:167 (1846).
Bidens abyssinica Schultz Bip. var. *glabrata* Vatke in Linnæa 39:500 (1875).
B. quadriseta Hochst. ex Oliver & Hiern in F.T.A. 3:393 (1877). DARFUR Jebel Marra, massif, 1350–2300 m; lowland plain, 1100 m; *Lynes* 609; *Kassas* 131, 185 & 634 (all KHU & CAI, *n.v.*).
DISTRIBUTION Ivory Coast to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and SW. Africa; widely distributed through the tropics of the Old World. Widely distributed through the central provinces of the Sudan.
FLORISTIC CATEGORY Palaeotropical weed.

426 ***Bidens borianiana* (Schultz Bip. ex Schweinf.) Cuf.** in Bull. Jard. Bot. Nat. Belg. 37:1136 (1967).
Coreopsis borianiana Schultz Bip. ex Schweinf. in Verh. Zool.-Bot. Ges. Wien 18:684 (1868); Sherff in Publ. Field Mus. 11:394 (1936); Andr., F.P.S. 3:19 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:232, fig. 249 (1963); Quézel, Dossier 5:124 (1969).
C. guineënsis Oliver & Hiern in F.T.A. 3:390 (1877). DARFUR Jebel Marra, piedmont 1170 m; lowland plain, 1020–1100 m; savanna. *Lynes* 610; *Wickens* 2570 & 2740.
DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia. Widely distributed through the central provinces of the Sudan.
FLORISTIC CATEGORY Sudanian and Afrotropical Domains.

427 ***Bidens chaetodonta* Sherff** in Bot. Gaz. 90:387 (1930) & in Publ. Field Mus. 16:615, t.180 (1937); Andr., F.P.S. 3:12 (1956); Cuf., Enum. :1136 (1967).
Coreopsis abyssinica Schultz Bip. in Walp., Repert. 6:163 (1846); Oliver & Hiern in F.T.A. 3:389 (1877); Broun & Massey, F.S. :290 (1929), *non Bidens abyssinica* Schultz Bip. (1846).
Prestinaria abyssinica Schultz Bip. ex Oliver & Hiern in F.T.A. 3:389 (1877).
DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; savanna and upland meadow. *Wickens* 2426, 2429, 2455, 2490 & 2608; *Kassas* 387 (KHU & CAI, *n.v.*).
DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra) and Ethiopia (Map 115).
FLORISTIC CATEGORY Ethiopian-montane.

428 ***Bidens pilosa* L.**, Sp. Pl. :832 (1753); Oliver & Hiern in F.T.A. 3:392 (1877); Norman in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :290 (1929); Sherff in Publ. Field Mus. 16:412, t.99 & 102 (1937); Andr., F.P.S. 3:11 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:234 (1963); Cuf., Enum. :1139 (1967); Quézel Dossier 5:123 (1969).
DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; lowland plain, 1100 m; stream banks and irrigated lands. *Lynes* 23 & 601; *Macintosh* 84; *Dandy* 64 (BM!); *Aglen* 25; *Robertson* 121; *Pettet* 146; *Wickens* 1017, 1071, 1431 & 2462; *Kassas* 461:18 (KHU & CAI, *n.v.*); *Kamil* 1095. Vernacular name: (Fur) *daou*.
DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south to the Cape; widely distributed in the tropics. Widespread in the southern provinces of the Sudan.
FLORISTIC CATEGORY Pantropical weed.

429 ***Bidens prestinaria* (Schultz Bip.) Cuf.** in Bull. Jard. Bot. Nat. Belg. 37:1140 (1967).
Coreopsis prestinaria Schultz Bip. in Walp., Repert. 6:163 (1846); Oliver & Hiern in F.T.A. 3:391 (1877); Sherff in Publ. Field Mus. 11:445 (1936).
DARFUR Lowland plain, Jebel Sirmi, 1130 m; fallow lands. *Wickens* 2321.
DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra and Nuba Mtns.) and Ethiopia (Map 116).
FLORISTIC CATEGORY Ethiopian-montane.

430 ***Bidens schimperi* Schultz Bip.** in Walp., Repert. 6:168 (1846); Oliver & Hiern in F.T.A. 3:393 (1877); Broun & Massey, F.S. :291 (1929); Sherff in Publ. Field Mus. 16:554, t.142, 143 & 144 (1937); Andr., F.P.S. 3:11 (1956); Cuf., Enum. :1141 (1967); Quézel, Dossier, 5:123 (1969).
DARFUR Jebel Marra, massif, 1780–1900 m; lowland plain, 1020–1030 m; arable lands. *Macintosh* 89 & 144; *Wickens* 2081 & 2311; *Kassas* 423 (KHU & CAI, *n.v.*).
DISTRIBUTION Egypt, Darfur, the Red Sea Hills and the southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to Natal and SW. Africa.
FLORISTIC CATEGORY Sudano-Zambezian Region.

431 ***Blumea solidaginoïdes* (Poir.) DC.**, Prodr. 5:443 (1936); Cuf., Enum. :1093 (1966).
Gnaphalium solidaginoïdes Poir., Encycl. Bot. Suppl. 2:805 (1811).
Blumea perrottetiana DC., Prodr. 5:443 (1836); C. D. Adams in F.W.T.A. ed. 2, 2:261 (1963); Wickens, For. Bull. 14(N.S.) :29 (1969).
B. mollis (D. Don) Merrill in Philipp. Journ. Sci. 5:395 (1910); C. D. Adams in F.W.T.A. ed. 2, 2:261 (1963); Wickens, For. Bull. 14(N.S.) :29 (1969).
[*B. lacera* sensu Norman in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :282 (1929); Andr., F.P.S. 3:14 (1956), *non* DC. (1836).]
DARFUR Jebel Marra, piedmont and massif, 1160–2060 m; moist sites. *Lynes* 3 & 18; *Macintosh* 87; *Dandy* 60 (BM!); *Pettet* 150; *Wickens* 966, 1082, 1193, 1262, & 1600; *Kassas* 293:5, 293:51, 346 & 360:19 (all KHU & CAI, *n.v.*); *Kamil* 1155.
DISTRIBUTION Senegal eastwards to Ethiopia and south to Angola and Zambia; also in SE. Asia and northern Australia. Widely distributed through the central and southern provinces of the Sudan.
FLORISTIC CATEGORY Palaeotropical.

432 ***Centaurea senegalensis* DC.**, Prodr. 6:598 (1838); Oliver & Hiern in F.T.A. 3:437 (1877); Lester-Garland in Journ. Bot. 59:48 (1921); Broun & Massey, F.S. :295 (1929); Andr., F.P.S. 3:15 fig. 1 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:291, fig. 265 (1963); Jeffrey in Kew Bull. 22:136 (1968).
DARFUR Jebel Marra, massif, 1800–2600 m; lowland plain, 825–100 m; arable lands. *Lynes* s.n. (BM!) & 66; *Macintosh* 23; *Dandy* 30 (BM!); *Wickens* 2838 & 2908.

DISTRIBUTION Mauritania to Cameroon eastwards to the provinces of Darfur and Kordofan in the Sudan Republic (Map 117).

FLORISTIC CATEGORY Sahelian Domain.

433 **Chrysanthellum americanum** (L.) Vatke in Abh. Nat. Brem. 9:122 (1885); Milne-Redhead in Kew Bull. 3:466 (1949); Andr., F.P.S. 3:17, fig. 2 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:234, fig. 250 (1963); Cuf., Enum. :1134 (1967); Quézel, Dossier 5:124 (1969).
Anthemis americana L., Sp. Pl. :895 (1753), non L.f. (1781).
Chrysanthellum procumbens L. C. Rich. in Pers., Syn. Pl. 2:471 (1807); Oliver & Hiern in F.T.A. 3:395 (1877); Broun & Massey, F.S. :291 (1929), *nom. illegit.*

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; lowland plain 1020 m; weed of waste places. *Wickens* 2056, 2354 & 2962; *Kassas* 184 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal eastwards to the central and southern provinces of the Sudan Republic southwards to SW. Africa and the Transvaal; a widespread tropical weed from America.

FLORISTIC CATEGORY Pantropical weed.

434 **Conyza aegyptiaca** (L.) Aiton, Hort. Kew. 3:183 (1789); Oliver & Hiern in F.T.A. 3:314 (1877); Broun & Massey, F.S. :281 (1929); Andr., F.P.S. 3:19 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:254 (1963); Cuf., Enum. :1086 (1966).
Erigeron aegyptiacum L., Syst. Nat. ed. 12, :549 (1767) & Mant. 1:112 (1767).

var. **aegyptiaca**; C. D. Adams in F.W.T.A. ed. 2, 2:254 (1963); Wickens, For. Bull. 14(N.S.) :29 (1969).

DARFUR Jebel Marra, piedmont, and massif, 1090–2300 m; lowland plain 1020 m; arable weed. *Macintosh* 68 & 81; *Wickens* 1767; *Kassas* 643 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and Angola. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

435 **Conyza hochstetteri** Schultz Bip. ex A. Rich., Tent. Fl. Abyss. 1:387 (1847); Oliver & Hiern in F.T.A. 3:312 (1877); Broun & Massey, F.S. :281 (1929); Andr., F.P.S. 3:18 (1956); Cuf., Enum. :1088 (1966).
Erigeron hochstetteri Schultz Bip. ex Schweinf., Fl. Aethiop. :147 (1867).

[*Conyza subscaposa* sensu Wickens, For. Bull. 14(N.S.) :29 (1969). non O. Hoffm. (1894).]

DARFUR Jebel Marra, massif, 1765–2600 m; open savanna and upland grassland. *Macintosh* 21 & 81; *Wickens* 986, 2693 & 2985. DISTRIBUTION Sudan Republic and Ethiopia southwards through E. Africa to Rhodesia; also in Socotra and Arabia. Recorded in the Sudan from the Didinga Hills (and the Fung *fide* Andr., *l. c.*, but no specimens seen).

FLORISTIC CATEGORY Afriental and Zambezian Domains.

436 **Conyza pyrrophappa** Schultz Bip. ex A. Rich., Tent. Fl. Abyss. 1:389 (1847); Oliver & Hiern in F.T.A. 3:318 (1877); Cuf., Enum. :1089 (1966); Wickens, For. Bull. 14(N.S.) :29 (1969); Wild in Bol. Soc. Brot. II, 43:263 (1969).
Microglossa angolensis Oliver & Hiern in F.T.A. 3:309 (1877); C. D. Adams in F.W.T.A. ed. 2, 2:251 (1963).
subsp. **pyrrophappa**; Wild in Bol. Soc. Brot. II, 43:263, figs. 1, 9 & 2, 9a (1969).

Pluchea crenata Quézel in Bull. Soc. Hist. Nat. Afr. Nord 48:103 (1957) & Univ. Alger. Inst. Rech. Sahar. Mém. 4:187, pl. 11 (1958), *synon. nov.*

DARFUR Jebel Marra, massif, 1750–2700 m; upland grassland and fallow lands. *Dandy* 120 (BM!); *Jackson* 2615, 3301 & 3330; *Robertson* 133; *Wickens* 1952 & 2826.

DISTRIBUTION Upland and lowland areas of N. Nigeria, Cameroon and Sudan Republic (Jebel Marra and the Didinga Hills), Ethiopia southwards through E. Africa to Malawi, Zambia and Angola; also in Tibesti, Egypt and the Yemen (Map 118).

FLORISTIC CATEGORY Afro-montane and Sudano-Zambezian Regions.

437 **Conyza schimperi** Schultz Bip. ex A. Rich., Tent. Fl. Abyss. 1:386 (1847); Wickens, For. Bull. 14(N.S.) :29 (1969); Wild in Bol. Soc. Brot. II, 43:257 (1969).
[*C. stricta* sensu Oliver & Hiern in F.T.A. 3:318 (1877); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :281 (1929); Andr., F.P.S. 3:19 (1956); Cuf., Enum. :1089 (1965), pro parte, non Willd. (1803) sensu stricto.]
subsp. **schimperi**; Wild in Bol. Soc. Brot. II, 43:257, figs. 1, 4a & 2, 4 (1969).

Nidorela sp., Wickens, For. Bull. 14(N.S.) :30 (1969).

DARFUR Jebel Marra, massif, 1850–3070 m; upland grassland and arable lands. *Lynes* s.n. & 173; *Rugman* 4; *Macintosh* 20; *Sandison* 1, 2 & 3 (BM!); *Dandy* 95 & 183 (both BM!); *Aglen* 62; *Jackson* 2574, 2653 & 3341; *Robertson* 156; *Francis* 62; *Wickens* 1210, 2371 & 2416.

DISTRIBUTION Sudan Republic (Jebel Marra) and uplands of Ethiopia (Map 119).

FLORISTIC CATEGORY Ethiopian-montane with an outlier on Jebel Marra.

Note: Wild, *l. c.* (1969) mentions that this taxon differs from *C. stricta* var. *pinnatifida* (D. Don) Kitamura, with which it has been confused, in being a more robust annual with non-membranous leaves and having less dense corymbs of capitula including mature pappus 4–8 mm long as against 3 mm or less.

Wild also noted a more robust form, which may be perennial, from Jebel Marra (*Dandy* 85—which I have not seen, *Jackson* 2653 & 3341), from c. 3000 m. The leaves are more densely arranged, overlapping with short nodes and linear leaf lobes. However there appear to be intermediate forms (*Aglen* 62 & *Wickens* 2371), consequently Wild did not consider the forms quite worthy of subspecific status.

438 **Conyza stricta** Willd., Sp. Pl. ed. 4, 3:1922 (1803); Oliver & Hiern in F.T.A. 3:318 (1877), excl. syn. *Erigeron schimperi* Schultz Bip.; Broun & Massey, F.S. :281 (1929), pro parte; Andr., F.P.S. 3:19 (1956), pro parte; C. D. Adams in F.W.T.A. ed. 2, 2:255 (1963); Cuf., Enum. :1089 (1965), pro parte; Quézel, Dossier 5:124 (1969); Wild in Bol. Soc. Brot. II, 43:250 (1969).

C. vatkeana Oliver & Hiern in F.T.A. 3:314 (1877).

var. **stricta**; Wild in Bol. Soc. Brot. II, 43:251, figs. 1a–b & 2, 1a (1969).

DARFUR Jebel Marra, massif, 1525 m. *Pellet* 156.

DISTRIBUTION Nigeria to Somali Republic southwards to Mozambique, Rhodesia and Angola; also in Madagascar and SE. Asia. Widespread in the Red Sea Hills and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

Note: The following specimens: Jebel Marra, Golol, Tora Tonga and Deriba, Dec. 1965, *Kassas* 179, 222, 223, 293:22, 264:1, 493 & 555 (all KHU & CAI, *n.v.*) are said to be *C. stricta*; it is possible that a number of these specimens should be referred to the previous species, *C. schimperi*.

439 **Conyza** sp.

DARFUR Nyertete, an occasional weed of arable lands, ash piedmont soils, 1160 m; *Wickens* 1349. Near to *C. hochstetteri* Schultz Bip. ex A. Rich, but differs in having larger capitula and narrower bracts.

440 **Crassocephalum picridifolium** (DC.) S. Moore in Journ. Bot. 50:212 (1912); Andr., F.P.S. 3:21 (1956); C.D. Adams in F.W.T.A. ed. 2, 2:248 (1963); Cuf., Enum. :1150 (1967).

Senecio picridifolius DC., Prodr. 6:386 (1838); Oliver & Hiern in F.T.A. 3:413 (1877); Broun & Massey, F.S. :293 (1929).

[*Crassocephalum vitellinum* sensu Norman in Journ. Bot. 62:139 (1924), non (Benth.) S. Moore (1912).]

[*Gynura vitellina* sensu Broun & Massey, F.S. :292 (1929), pro parte non Benth. (1849).]

DARFUR Jebel Marra, piedmont and massif, 1160–2600 m; stream banks and marshy places. *Lynes* s.n. 168 & 169; *Macintosh* 82; *Drar* 2183 (CAI!); *Jackson* 3291; *Wickens* 1006, 1411 & 2889. Vernacular name: (Fur) *dagara*; (Arabic) *tacta*.

DISTRIBUTION Mali to Nigeria eastwards to Ethiopia and south through E. Africa to the Cape. Occurs in the southern provinces *vide* Andr., *l. c.*, but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambezian Region.

441 **Crepis rueppellii** Schultz Bip. in Flora 22:20 (1839);

Oliver & Hiern in F.T.A. 3:450 (1877); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :296 (1929); Babcock, Genus *Crepis* :892, figs. 296, 297 & 298 (1947); Andr., F.P.S. 3:22 (1956); Cuf., Enum. :1191 (1967).

DARFUR Jebel Marra massif, 1350–3000 m; upland grassland. *Lynes* 19, 55 & 165 (BM!); *Dandy* 98 & 126 (both BM!); *Jackson* 2625 & 3371; *Wickens* 1462, 2868 & 2993; *Kassas* 676 (KHU & CAI, *n.v.*).

DISTRIBUTION Uplands of Sudan Republic, Ethiopia, Somali Republic, Uganda, Kenya and Tanzania (Map 120). Also found in the Imatongs and Didinga Hills of the Sudan.

FLORISTIC CATEGORY Afro-montane.

442 **Dichrocephala chrysanthemifolia** (Blume) DC. in Guill., Arch. Bot. 2:518 (1833); Oliver & Hiern in F.T.A. 3:303 (1877); Andr., F.P.S. 3:23 (1956); C.D. Adams in F.W.T.A. ed. 2, 2:256 (1963); Cuf., Enum. :1081 (1966).

Cotula chrysanthemifolia Blume, Bijdr. :918 (1826).

Dichrocephala tibetica Quézel in Bull. Soc. Hist. Nat. Afr. Nord. 84:99 (1957) & Miss. Bot. Tibest :185, fig. 11A (1958), **synon. nov.**

DARFUR Jebel Marra, massif, 2300–2750 m; upland meadow. *Macintosh* 55; *Wickens* 2361, 2407, 2428, 2686; *Kassas* 579, 648 & 703 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *murr murr*.

DISTRIBUTION Uplands of Cameroon, Fernando Po, Sudan Republic (Jebel Marra, and Red Sea Hills), Ethiopia, Uganda, Kenya, Tanzania and Malawi; also in Asia and Madagascar.

FLORISTIC CATEGORY Palaeotropical.

443 **Dicoma tomentosa** Cass. in Bull. Sci. Soc. Philom. Paris 1818:47 (1818); Oliver & Hiern in F.T.A. 3:443 (1877); Broun & Massey, F.S. :296 (1929); Andr., F.P.S. 3:23 (1956); C.D. Adams in F.W.T.A. ed. 2, 2:287 (1963); Jeffrey in Kew Bull. 21:208 (1967); Cuf., Enum. :1179 (1967); Quézel, Dossier 5:124 (1969).

DARFUR Jebel Marra, piedmont, 1130m; bare tuff. *Wickens* 2550.

DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Egypt, Socotra, W. Pakistan and western India. Widely distributed through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

444 **Echinops boranensis** Lanza, Miss. Biol. Borana Racc. Bot. Ang.-Gymn. :267 (1939); Cuf., Enum. :1169 (1967); Jeffrey in Kew Bull. 22:119 (1968).

[*E. spinosus* sensu Oliver & Hiern in F.T.A. 3:431 (1877), excl. descr.; sensu Andr., F.P.S. 3:26, non L. (1767).]

DARFUR Jebel Marra, *sine loc.* *Macintosh* 24.

DISTRIBUTION Uplands of Sudan Republic (Jebel Marra), Ethiopia, Somali Republic and Kenya; also occurs in Arabia (Yemen and adjacent areas) (Map 121).

FLORISTIC CATEGORY Afro-montane.

445 **Echinops longifolius** A. Rich., Tent. Fl. Abyss. 1:452 t.61 (1848); Oliver & Hiern in F.T.A. 3:431 (1877); Broun & Massey, F.S. :294 (1929); Andr., F.P.S. 3:25 (1956); C.D. Adams in F.W.T.A. ed. 2, 2:290 (1963), pro parte, excl. fig. 264; Cuf., Enum. :1170 (1967); Jeffrey in Kew Bull. 22:120 (1968). *E. schweinfurthii* Mattfeld in Engl., Bot. Jahrb. 59, Beibl. 133:54 (1924).

DARFUR Jebel Marra, piedmont and massif, 1160–1525 m; fallow lands. *Pellet* 151; *Wickens* 1180 & 2166; *Kassas* 165 & 293:9 (both KHU & CAI, *n.v.*); *Kamil* 1078.

DISTRIBUTION Uplands of Mali to Cameroon eastwards to Ethiopia, Uganda, Kenya and Tanzania (Map 122). Found in the southern provinces of the Sudan.

FLORISTIC CATEGORY Afro-montane.

446 **Echinops macrochaetus** Fresen. in Mus. Senck. 3:69 (1840); Oliver & Hiern in F.T.A. 3:432 (1877); Broun & Massey, F.S. :294 (1929); Andr., F.P.S. 3:25 (1956); Cuf., Enum. :1171 (1967); Jeffrey in Kew Bull. 22:119 (1968); Quézel, Dossier 5:124 (1969).

DARFUR Jebel Marra, massif, 1350–3000 m; upland grassland. *Lynes* 58a & b; *Dandy* 96 (BM!); *Jackson* 2573; *Robertson* 149; *Kassas* 226, 253, 455 & 567 (all KHU & CAI!). Vernacular name: (Fur) *meirre* or *pirrzi*; (Arabic) *marra*.

DISTRIBUTION Sudan Republic (Jebel Marra and Red Sea Hills) & Ethiopia (Map 123).

FLORISTIC CATEGORY Ethiopian-montane.

447 **Eclipta prostrata** (L.) L., Mant. Pl. Alt. :286 (1771); Andr., F.P.S. 3:26, fig. 4 (1956); C.D. Adams in F.W.T.A. ed. 2, 2:241 (1963); Cuf., Enum. :1126 (1967). *Verbesina alba* L., Sp. Pl. :902 (1753).

V. prostrata L., Sp. Pl. :902 (1753).

Eclipta alba (L.) Hassk., Pl. Jav. Rar. :528 (1848); Oliver & Hiern in F.T.A. 3:373 (1877); Broun & Massey, F.S. :288 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 700–1020 m; marshy places. *Wickens* 1109, 1357, 1642, 1796 & 2264; *Kassas* 853 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal eastwards to Egypt and the Somali Republic and south to SW. Africa, Transvaal and Natal; widespread throughout the tropics. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Pantropical weed.

448 **Ethulia conyzoides** L.f., Decas Prima Pl. Rar. 1, t.1 (1762); Oliver & Hiern in F.T.A. 3:262 (1877); Broun & Massey, F.S. :275 (1929); Andr., F.P.S. 3:29 (1956); C.D. Adams in F.W.T.A. ed. 2, 2:284 (1963); Cuf., Enum. :1062 (1966); Quézel, Dossier 5:124 (1969).

DARFUR Jebel Marra, location not traced; lowland plain, 790–1020 m; alluvial scree. *Macintosh* 45; *Robertson* 30; *Wickens* 1111, 1777 & 2945; *Kassas* 360:7 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; also in SE. Asia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical weed.

449 **Felicia dentata** (A. Rich.) Dandy ex F. W. Andr., F.P.S. 3:29 (1956); Cuf., Enum. :1082 (1966); Quézel, Dossier 5:124 (1969); Grau in Mitt. Bot. München 9:435 (1973).

Agathaea dentata A. Rich., Tent. Fl. Abyss. 1:384 (1847), non *Aster dentatus* Thunb. (1800).

Felicia richardi Vatke in Linnaea 39:481 (1875); Oliver & Hiern in F.T.A. 3:306 (1877); Broun & Massey, F.S. :280 (1929).

subsp. **nubica** Grau in *l. c.* :437, fig. 36c, map 48 (1973).

Aster sp. near *A. richardi* Vatke, Wickens, For. Bull. 14(N.S.) :28 (1969).

DARFUR Jebel Marra, massif, 2050–3000 m; upland grassland. *Lynes* 166 & 167 (BM!); *Sandison* 47, 48, 49, 50 & 51 (all BM!); *Dandy* 118 (BM!); *Jackson* 3344 & 4069; *Robertson* 153; *Wickens* 1220, 1223 (holotype of subsp. *nubica*), 2435 & 2640; *Kassas* 667 & 711 (both KHU & CAI). Vernacular name: (Fur) *tabu torroh*.

DISTRIBUTION subsp. *nubica* only known from the Sudan Republic (Jebel Marra & its outlier, Jebel Gurgeil); subsp. *dentata* known from Ethiopia and Arabia (Map 124 and *Grau l. c.*).

FLORISTIC CATEGORY (of the species). Ethiopian-montane with an outlier on Jebel Marra.

Note: The Jebel Marra material differs from the Ethiopian material in having glabrous leaves and bracts, except for some portions of *Lynes* 167 which are hirsute, as are the Ethiopian plants. *Lynes* 167 is undoubtedly a mixed gathering and it is strange that the hirsute variant has not been re-collected from Jebel Marra.

Cufodontis *l. c.* has given the distribution of *F. dentata* as Shoa, Godjam, Beghemder, Eritrea, Tigre and Wollo Provinces in Ethiopia, SE. Egypt, Darfur, Niger and Arabia. The specimen from Jebel Elba in the Kew Herbarium is too poor for accurate determination. De Miré & Gillet in *Journ. Agric. Trop. et Bot. Appl.* 3:707 (1956) also record *Aster richardi* from Air in Niger; I have not seen any specimens from Air.

450 ***Galinsoga parviflora*** Cav., *Icon.* 3:141 (1794); Andr., F.P.S. 3:30 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:230 (1963); Cuf., *Enum.* 1:143 (1967).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; arable lands and stream banks. *Jackson* 2545; *Robertson* 111; *Pettet* 154; *Wickens* 973, 1444 & 1651.

DISTRIBUTION Cameroon Mtn., the central provinces of the Sudan Republic, Ethiopia and E. Africa southwards to the Transvaal; a native of S. America, now widespread throughout the world.

FLORISTIC CATEGORY Subcosmopolitan weed.

451 ***Geigeria alata*** (DC.) Benth. & Hook. ex Oliver & Hiern in F.T.A. 3:368 (1877); Lester-Garland in *Journ. Bot.* 59:48 (1921); Broun & Massey, F.S. 1286 (1929); Andr., F.P.S. 3:31, fig. 5 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:257 (1963); Cuf., *Enum.* 1:123 (1967); *Wickens* For. Bull. 14(N.S.) :28 (1969); Quézel, *Dossier* 5:124 (1969).

DARFUR Lowland plain; seasonal ponds. *Lynes* s.n. & 351a (BM!). DISTRIBUTION Mali to Cameroon eastwards to the Somali Republic, also Kenya, Angola and SW. Africa and extending into Egypt and Arabia. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

452 ***Gnaphalium luteo-album*** L., Sp. Pl. :851 (1753); Oliver & Hiern in F.T.A. 3:343 (1877); Broun & Massey, F.S. :284 (1929); Andr., F.P.S. 3:31 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:266 (1963); Cuf., *Enum.* 1:106 (1966).

DARFUR Jebel Marra, piedmont and massif, 1160–2440 m; arable weed. *Aglen* 42; *Wickens* 1212a & 1661; *Kassas* 293:28 & 640 (both KHU & CAI, n.v.); *Kamil* 1097.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and southwards through E. Africa to the Cape; widespread through the warm temperate and subtropical areas of the world. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

453 ***Gnaphalium marranum*** Philipson in *Journ. Bot.* 75:317 (1937); Andr., F.P.S. 3:32 (1956).

[*Helichrysum abyssinicum* sensu Lester-Garland in *Journ. Bot.* 59:48 (1921); Broun & Massey, F.S. :285 (1929), *non* Schultz Bip. (1845).]

DARFUR Jebel Marra, massif, 2300–3070 m; upland meadow. *Lynes* 55a & 55b (BM, holotype of *G. marranum*!); *Macintosh* 39; *Sandison* 32 (BM!); *Dandy* 86 (BM!); *Jackson* 2650 & 4067; *Wickens* 1212b, 1645, 2364 & 2417; *Kassas* 293:28 & 720 (both KHU & CAI, n.v.). Vernacular name: (Fur) *naam*.

DISTRIBUTION Only known from Jebel Marra from above 2300 m. FLORISTIC CATEGORY Endemic.

Note: This species differs from *G. luteo-album* L. in the greater wooliness of the whole plant and in having larger capitula and florets. The achenes are glabrous whereas those of *G. luteo-album* have upwardly curved papillae.

454 ***Gnaphalium undulatum*** L., Sp. Pl. :852 (1853); C. D. Adams in F.W.T.A. ed. 2, 2:266 (1963); Cuf., *Enum.* 1:107 (1966).

G. steudelii (Schultz Bip. ex A. Rich.) Schultz Bip. in Schweinf., *Beitr. Fl. Abyss.* 1:149 (1867).

DARFUR Jebel Marra, 1350 m. *Kassas* 292 (KHU & CAI!).

DISTRIBUTION Chiefly from the uplands of Cameroon, Sudan Republic (Jebel Marra), Ethiopia, Uganda, Tanzania, Malawi, Rhodesia, Natal; also in Madagascar (Map 125).

FLORISTIC CATEGORY Afro-montane and Madagascan Region.

455 ***Gnaphalium schultzei*** Mendonça, *Contrib. Conhec. Fl. Angola* 1, Compos. :63 (1943); Cuf., *Enum.* 1:107 (1966), *non* Wedd., Cabrera (1948).

Helichrysum globosum Schultz Bip. ex A. Rich., *Tent. Fl. Abyss.* 1:425 (1848); Oliver & Hiern in F.T.A. 3:354 (1877); C. D. Adams in F.W.T.A. ed. 2, 2:264 (1963); *Wickens*, *For. Bull.* 14(N.S.) :29 (1969).

DARFUR Jebel Marra, 2600 m; upland grassland. *Wickens* 2692.

DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra and the Imatongs), Ethiopia, E. Africa, Rhodesia and Angola.

FLORISTIC CATEGORY Afro-montane (Map 126).

456 ***Gnaphalium* sp. ? *G. luteo-album* × *G. marranum***

DARFUR Jebel Marra, Tora Tonga, 2300 m; *Wickens* 1726.

Differs from *G. luteo-album* and *G. marranum* in the achenes having papillose ribs. Further collections are required.

457 ***Guizotia scabra*** (Vis.) Chiov. in *Ann. R. Ist. Bot. Roma* 8:184 (1904); Andr., F.P.S. 3:32 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:230 (1963); Cuf., *Enum.* 1:133 (1967); Quézel, *Dossier* 5:125 (1969).

Veslingia scabra Vis., *Nuovi Saggi Accad. Sci. Padova* 5:269 (1840). subsp. *scabra*; Baagøe in *Bot. Tidsskrift* 69:25, fig. 3-5, 11, 13, 15/C, D, G, H, 19, 20 (1974).

Guizotia schultzei Hochst. ex Walp., *Repert.* 6:158 (1846); Oliver & Hiern in F.T.A. 3:385 (1877); Norman in *Journ. Bot.* 62:139 (1924); Broun & Massey, F.S. :290 (1929).

[*G. schimperii* sensu Broun & Massey, F.S. :291 (1927); Andr., F.P.S. 3:33 (1956) *non* Schultz Bip. (1846).]

DARFUR Jebel Marra, piedmont and massif, 1160–2820 m; lowland plain, 1020 m; arable lands, wayside and upland grassland. *Lynes* 172a & b and 608b; *Sandison* 65, 66 & 67 (all BM!); *Dandy* 123 (BM!); *Drar* 2217 (CAI!); *Jackson* 2623; *Pettet* 47; *Wickens* 1035, 1054, 1340, 1785 & 2634; *Kassas* 272, 417 & 644 (all KHU & CAI, n.v.); *Sahni* 439.

DISTRIBUTION Nigeria eastwards to Ethiopia and south through E. Africa to Rhodesia and Mozambique. Widely distributed in the southern provinces of the Sudan (Map: Baagøe *l. c.* fig. 5 (1974).

FLORISTIC CATEGORY Sudano-Zambezian Region.

458 ***Gutenbergia rueppellii*** Schultz Bip. in *Gedenkb.* 4 Jubelf. Buchdr. 120, t.4 (1840); Oliver & Hiern in F.T.A. 3:263 (1877); Andr., F.P.S. 3:33 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:284 (1963); Cuf., *Enum.* 1:063 (1966).

Erlangea rueppellii (Schultz Bip.) Broun & Massey, F.S. :275 (1929), *nomen illegit.*

DARFUR Lowland plain, 1050 m; savanna. *Wickens* 2238.

DISTRIBUTION N. Nigeria, southern provinces of the Sudan Republic, Ethiopia, Uganda and Kenya.

FLORISTIC CATEGORY Sudanian and Afrioriental Domains.

459 ***Helichrysum glumaceum* DC.**, Prodr. 6:197 (1838); C. D. Adams in F.W.T.A. ed. 2, 2:264 (1963); Cuf., Enum. :1111 (1966); Wickens, For. Bull. 14(N.S.) :30 (1969).

Achyrocline luzuloides Schultz Bip. ex Vatke in Oestr. Bot. Zeit. :326 (1875); Oliver & Hiern in F.T.A. 3:340 (1877); Broun & Massey, F.S. :283 (1929); Quézel, Dossier 5:123 (1969). *A. glumacea* (DC.) Oliver & Hiern in F.T.A. 3:340 (1877) pro parte; Norman in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :283 (1929).

Helichrysum luzuloides (Vatke) Lanza in Miss. Biol. Borana, Racc. Bot. Anglo.-Gymno. :254 (1838); Andr., F.P.S. 3:36 (1956).

DARFUR Jebel Marra, massif, 1340–2600 m; lowland plain, 1020 m; arable lands and upland grassland. *Lynes* 169a & b; *Rugman* 8; *Macintosh* 4; *Dandy* 50 & 188 (BM!); *Jackson* 2589 & 3319; *Wickens* 1195, 1204, 2087 & 2505; *Kassas* 170, 277 & 431 (all KHU & CAI, *n.v.*); *Sahni* 432. Vernacular name: (Fur) *murr murr*.

DISTRIBUTION Senegal, Mauritania, Sudan Republic (Jebel Marra, Jebel Gurgeil and Red Sea Hills), Ethiopia, Somali Republic, Uganda, Kenya, Tanzania and Angola; also in Egypt, Socotra and Arabia.

FLORISTIC CATEGORY Sahelian, Afriental and South Arabian Domains.

460 ***Lactuca capensis* Thunb.**, Prodr. Fl. Cap. :139 (1800); Oliver & Hiern in F.T.A. 3:452 (1877); Broun & Massey, F.S. :297 (1929); Andr., F.P.S. 3:38 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:293 (1963); Jeffrey in Kew Bull. 18:450 (1966); Cuf., Enum. :1188 (1967); Quézel, Dossier 5:125 (1969).

L. abyssinica Fresen. in Mus. Senck. 3:72 (1839); Oliver & Hiern in F.T.A. 3:453 (1877); Broun & Massey, F.S. :297 (1929). *L. hochstetteri* (A. Rich.) Schultz Bip. ex Oliver & Hiern in F.T.A. 3:453 (1877), incl. var. *humilis* (A. Rich.) Oliver & Hiern. [*L. rariflora* sensu Norman in Journ. Bot. 62:139 (1924), *non* Fresen (1839).]

DARFUR Jebel Marra, piedmont and massif, 1160–3000 m; arable lands and upland grassland. *Lynes* 24, 54c & 164 (BM!); *Sandison* 69 (BM!); *Macintosh* 15, 34, 44, 52 & 105; *Dandy* 45, 138 & 165 (all BM!); *Aglen* 27; *Jackson* 3390; *Wickens* 1173, 1240, 1268, 1429, 1822, 2783, 2875, 2884 & 2990; *Kassas* 238, 383, 461:10, 628, 705 & 795 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *julgud* or *salluk*; (Arabic) *erg el barreh*. Grazed by all stock.

DISTRIBUTION Uplands from Mali to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; also in Madagascar and the Yemen. Also occurs in the Sudan in the Imatongs and Didinga Hills.

FLORISTIC CATEGORY Afro-montane and Madagascar Region.

461 ***Laggera braunii* Vatke** in Linnaea 39:486 (1875); Oliver & Hiern in F.T.A. 3:326 (1877); C. D. Adams in F.W.T.A. ed. 2, 2:262 (1963).

DARFUR Jebel Marra, massif, 1350–1525 m; *Pettet* 155; *Kassas* 153 & 261 (both KHU & CAI!).

DISTRIBUTION Northern Nigeria, Cameroon, Sudan Republic, (Jebel Marra) and Ethiopia (Map 127).

FLORISTIC CATEGORY Afro-montane.

462 ***Laggera oloptera* (DC.) C. D. Adams** in Journ. W. Afr. Sci. Assoc. 6:152 (1961) & in F.W.T.A. ed. 2, 2:262 (1963).

Blumea oloptera DC., Prodr. 5:448 (1836).

Laggera oblonga Oliver & Hiern in F.T.A. 3:327 (1877); Andr., F.P.S. 3:40 (1956).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Macintosh* 80; *Wickens* 1656 & 2912.

DISTRIBUTION Senegal to Nigeria eastwards to the southern provinces of the Sudan Republic.

FLORISTIC CATEGORY Sudanian Domain.

463 ***Laggera pterodonta* (DC.) Schultz Bip. ex Oliver** in Trans. Linn. Soc. 29:94 (1873); Oliver & Hiern in F.T.A. 3:324 (1877); Broun & Massey, F.S. :282 (1929); Andr., F.P.S. 3:39 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:262 (1963); Cuf., Enum. :1095 (1966).

Blumea pterodonta DC., Prodr. 5:448 (1834).

DARFUR Jebel Marra, piedmont and massif, 1160–2050 m; arable weed. *Dandy* 76 (BM!); *Wickens* 1096; *Kassas* 160 & 538 (both KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and southwards through E. Africa to the Transvaal also in tropical Asia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical weed.

464 ***Launaea nana* (Baker) Chiov.**, Res. Sci. Miss. Stef.-Paoli 1:108 (1916); Jeffrey in Kew Bull. 18:466 (1966); Wickens, For. Bull. 14(N.S.) :30 (1969).

Lactuca nana Baker in Bull. Misc. Inf. Kew 1895:17 (1895).

Sonchus elliotianus Hiern, Cat. Welw. Afr. Pl. 1:623 (1898); Andr., F.P.S. 3:53 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:296 (1963).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1597. DISTRIBUTION Sierra Leone to Cameroon eastwards to the southern provinces of the Sudan Republic on the Uganda border, and south through E. Africa to the Transvaal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

465 ***Melanthera pungens* Oliver & Hiern** in F.T.A. 3:382 (1877); Broun & Massey, F.S. :289 (1929); Andr., F.P.S. 3:43 (1956).

M. ugandensis S. Moore in Journ. Bot. 54:256 (1916).

DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1100 m; savanna. *Lynes* 608a; *Drar* 2088 (CAI!); *Wickens* 2107.

DISTRIBUTION Senegal, southern provinces of the Sudan Republic, Uganda, Kenya and Tanzania (Map 128).

FLORISTIC CATEGORY Sudanian and Afriental Domains.

466 ***Osteospermum vaillantii* (Decne.) Norlindh** in Bot. Not. Lund. 1943:305, fig. 30c & d (1943); Andr., F.P.S. 3:44 (1956); Cuf., Enum. :1166 (1967); Quézel, Dossier 5:125 (1969).

Tripteris vaillantii Decne. in Ann. Sci. Nat. II, 2:260 (1834);

Oliver & Hiern in F.T.A. 3:424 (1877); Broun & Massey, F.S. :293 (1929).

T. lordii Oliver & Hiern in F.T.A. 3:424 (1877); Broun & Massey, F.S. :294 (1929).

DARFUR Jebel Marra, massif, 1900–2750 m; upland grassland. *Macintosh* s.n.; *Sandison* 33, 34 & 68 (all BM!); *Wickens* 1246, 1713, 1840, 2395, 2447 & 2660; *Kassas* 415, 557 & 629 (all KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra, Jebel Gurgeil and the Red Sea Hills), Ethiopia, Somali Republic and south through E. Africa to Malawi and Rhodesia; also in Egypt, Sinai, Arabia and Palestine (Map 119).

FLORISTIC CATEGORY Afro-montane.

Note: The distribution of *O. vaillantii* is interesting for it is the only species of *Osteospermum* to penetrate into the south-eastern Mediterranean, the centre of the related genus *Calendula*, thus forming a connecting link with the main centre of *Osteospermum* in southern Africa (Norlindh in Bot. Not. Lund. 1946:473 (1946)).

467 ***Pegolettia senegalensis* Cass.** in Dict. Sci. Nat. 38:232 (1825); Oliver & Hiern in F.T.A. 3:361 (1877); Broun & Massey, F.S. :285 (1929); Andr., F.P.S. 3:44 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:260 (1963); Cuf., Enum. :1118 (1967).

DARFUR Jebel Marra, massif, 1200 m; savanna. *Wickens* 2578 & 2814.

DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic, Tanzania, Rhodesia, Botswana, SW. Africa and the Transvaal; also in Egypt, Arabia and NW. India. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

Phagnalon scalarum Schweinf. ex Schwartz in Mitt. Inst. Bot. Hamburg 10:278 (1939); Andr., F.P.S. 3:44 (1956); Quézel, Dossier 5:125 (1969).
P. scalarum Schweinf. ex Blatt. in Rec. Bot. Surv. India 8:239 (1921); Norman in Journ. Bot. 62:134 (1924); Broun & Massey, F.S. :283 (1929), *nom. nudum*.
P. tibetica Chevass. & Quézel in Bull. Off. Nat. Anti-Acrid. No. 7:16 pl. 3 (1956).
P. tibetica Chevass. & Quézel subsp. *tibetica*; Quézel, Miss. Bot. Tibesti :185 (1958).
[P. hypoleucum sensu Wickens, For. Bull. 14(N.S.):30 (1969), *non* Schultz Bip. ex Oliver & Hiern (1877.)]

468 var. **scalarum**; Wickens in Kew Bull. 26:563 (1972).
 DARFUR Jebel Marra massif, c. 2200–2800 m; upland grassland. *Lynes* s.n. & 170 (BM!); *Macintosh* 22, 77 & 89; *Robertson* 148; *Wickens* 1233; *Kassas* 468, 474 & 517 (all KHU & CAI, *n.v.*).
 DISTRIBUTION Sudan Republic (Jebel Marra and Jebel Gurgeil) Tibesti and the Yemen (Map 130).
 FLORISTIC CATEGORY Saharo-montane and Afro-montane.

469 var. **meridionale** (Quézel) Wickens in Kew Bull. 26:564 (1972).
P. tibetica Chevass. & Quézel subsp. *meridionale* Quézel, Miss. Bot. Tibesti :184 (1958).
 DARFUR Jebel Marra, massif. *Macintosh* 79; *Drar* 2150 (CAI!).
 DISTRIBUTION Tibesti and Jebel Marra (Map 130).
 FLORISTIC CATEGORY Saharo-montane.
 Note: Further collections of this glabrescent variety are needed.

470 **Pluchea dioscoridis** (L.) DC., Prodr. 5:450 (1836); Oliver & Hiern in F.T.A. 3:329 (1877); Broun & Massey, F.S. :282 (1929); Andr., F.P.S. 3:45 (1956); Cuf., Enum. :1096 (1966).
Baccharis dioscorides L., Cent. Pl. 1:27 (1753).
 DARFUR Jebel Marra, massif, 1300–2300 m; stream bank and upland grassland. *Dandy* 31 (BM!); *Kassas* 491, 550 & 670 (all KMU & CAI!).
 DISTRIBUTION Northern and central provinces of the Sudan Republic, Ethiopia and Somali Republic south through E. Africa to the Transvaal and SW. Africa; also in Egypt, Sinai, Palestine, Arabia, Syria and Afghanistan.
 FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

471 **Pluchea nitens** O. Hoffm. in Engl., Bot. Jahrb. 20:226 (1894).
 DARFUR Lowland plain, 1000 m; limestone crevices (Kalla). *Wickens* 2890.
 DISTRIBUTION Sudan Republic (Darfur), Kenya, Tanzania, Zambia and Rhodesia.
 FLORISTIC CATEGORY Afriental and Zambezian Domains.

472 **Pulicaria crispa** (Forsk.) Oliver in Trans. Linn. Soc., Bot. 29:96 (1873); Oliver & Hiern in F.T.A. 3:366 (1877); Broun & Massey, F.S. :286 (1929); Andr., F.P.S. 3:46, fig. 8 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:258 (1963); Cuf., Enum. :119 (1967); Quézel, Dossier 5:125 (1969).
Aster crispus Forsk., Fl. Aegypt.-Arab. :150 (1775).
 DARFUR Jebel Marra, massif, c. 2200 m; lowland plain 790–1020 m; arable lands and waste places. *Macintosh* 46 & 53; *Wickens* 1129, 1747 & 2910.
 DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia (Map 131); also in North Africa from Cape Verde and the Canaries to Egypt, Arabia, Palestine and India. Widespread in the northern provinces of the Sudan.
 FLORISTIC CATEGORY Sahelian, Afriental and South Arabian Domains and Saharo-Sindian Region.

473 **Pulicaria scabra** (Thunb.) Druce in Rep. Bot. Exch. Club Brit. Is. 1916:642 (1917); Cuf., Enum. :1121 (1967); Wickens, For. Bull. 14(N.S.):30 (1969).

Erigeron scabrum Thunb., Prodr. Fl. Cap. :153 (1800).
[Pulicaria vulgaris sensu Norman in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :286 (1929), *pro parte, non* Gaertn. (1791).]
[P. dysenterica Gaertn. var. *stenophylla* sensu Andr., F.P.S. 3:46 (1956), *non* Boiss. (1875).]
 DARFUR Jebel Marra, massif, 1980–3070 m; stream banks. *Lynes* 18 & 22b (BM!); *Macintosh* 47; *Dandy* 158 & 163 (both BM!); *Jackson* 2611; *Wickens* 1247; *Kassas* s.n. (KHU & CAI, *n.v.*).
 DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia, rare in E. Africa, also occurs in the Cape and SW. Africa.
 FLORISTIC CATEGORY Afriental and Zambezian Domains.

474 **Pulicaria undulata** (L.) C. A. Mey., Verzeichn. Pfl. :79 (1831); Oliver & Hiern in F.T.A. 3:365 (1877); Norman in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :286 (1929); Andr., F.P.S. 3:46 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:258 (1963); Cuf., Enum. :1122 (1967).
Inula undulata L., Syst. Nat. ed. 12, :558 & Mant. 1:115 (1767).
 DARFUR Jebel Marra, piedmont and massif, 1160–300 m; arable lands. *Lynes* 171 & 171b (BM!); *Macintosh* 19; *Wickens* 1034, 1164 & 1758; *Kassas* 532, 837 & 870 (all KHU & CAI, *n.v.*).
 DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia; also in Egypt, Sinai, Arabia and Palestine (Map 132). Widespread in the northern and central provinces.
 FLORISTIC CATEGORY Sahelian and South Arabian Domains and Saharo-Sindian Region.

475 **Reichardia tingitana** (L.) Roth, Bot. Abh. :35 (1787); Oliver & Hiern in F.T.A. 3:445 (1877); Andr., F.P.S. 3:48 (1956); Jeffrey in Kew Bull. 18:477 (1966); Cuf., Enum. :1189 (1967); Quézel, Dossier 5:125 (1969).
Scorzonera tingitana L., Sp. Pl. :791 (1753).
Picridium tingitanum (L.) Desf., Fl. Atlant. 2:220 (1799); Norman in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :297 (1929).
 DARFUR Jebel Marra, massif, 1780–2300 m; lowland plain, 1050–1100 m; arable lands. *Lynes* 59 a & b & 60b; *Wickens* 1394, 1485 & 2322; *Kassas* 696 (KHU & CAI!). Vernacular name: (Fur) *kornari*; (Arabic) *umm al labano*.
 DISTRIBUTION Sudan Republic (Jebel Marra, Jebel Gurgeil and Red Sea Hills), Ethiopia and Somali Republic, sparsely scattered through Kenya and Tanzania (Map 133); also from the Canary Is. eastwards through the Mediterranean region to NW. India, introduced into Australia and the Hawaiian Is.
 FLORISTIC CATEGORY Saharo-Sindian and Mediterranean Regions and Afriental Domain.

476 **Sclerocarpus africanus** Jacq. ex Murray, Syst. Veg. ed. 14, :783 (1784); Oliver & Hiern in F.T.A. 3:374 (1877); Broun & Massey, F.S. :288 (1929); Andr., F.P.S. 3:48 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:235 (1963); Cuf., Enum. :1127 (1967); Quézel, Dossier 5:125 (1969).
 DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1020 m; arable lands. *Macintosh* 141; *Wickens* 1668, 2100 & 2359.
 DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through Kenya and Tanzania to Mozambique, Rhodesia and SW. Africa; also in Arabia and India. Widely distributed through the northern and central provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Region.

477 **Senecio abyssinicus** Schultz Bip. ex A. Rich., Tent. Fl. Abyss. 1:438 (1848); Oliver & Hiern in F.T.A. 3:410 (1877); Broun & Massey, F.S. :293 (1929); Andr., F.P.S. 3:48 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:249 (1963); Cuf., Enum. :1152 (1967); Quézel, Dossier 5:125 (1969).
 DARFUR Lowland plain, 1040–1070 m; rock crevices. *Wickens* 2086 & 2347.

DISTRIBUTION Nigeria and Cameroon eastwards to Ethiopia and south through E. Africa to Rhodesia and Angola. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

478 *Senecio hochstetteri* Schultz Bip. ex A. Rich., Tent. Fl. Abyss. 1:435 (1848); Oliver & Hiern in F.T.A. 3:414 (1877); C. D. Adams in F.W.T.A. ed. 2, 2:250 (1963); Cuf., Enum. 1:155 (1967); Wickens, For. Bull. 14(N.S.) :30 (1969).

DARFUR Jebel Marra, massif, 2650 m; irrigated garden. *Wickens* 1684. Vernacular name: (Fur) *summia*.

DISTRIBUTION Uplands of Guinée Republic, N. Nigeria, Cameroon, Sudan Republic (Jebel Marra), Ethiopia, and south through E. Africa to Malawi and Rhodesia (Map 134).

FLORISTIC CATEGORY Afro-montane.

479 *Senecio tuberosus* Schultz Bip. ex A. Rich., Tent. Fl. Abyss. 1:434, t.58 (1848); Oliver & Hiern in F.T.A. 3:413 (1877); Broun & Massey, F.S. :293 (1929); Andr., F.P.S. 3:49 (1956); Cuf., Enum. 1:159 (1967).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1816. DISTRIBUTION Sudan Republic (Jebel Marra and Gallabat, on the Ethiopian border) and Ethiopia (Map 135).

FLORISTIC CATEGORY Afriental Domain with a Jebel Marra extension.

480 *Senecio* sp. nov.

DARFUR Jebel Marra, Tereng Plateau, scapose, rhizomatose herb growing in water along marsh fringe, 2600 m; *Wickens* 2675. Note: Near *Crassocephalum tetraphyllum* (O. Hoffm.) Milne-Redh. from Tanzania, from which it differs in the shorter style arms and the branched inflorescence. Further collections of this species are required. The enormous *Senecio*/*Crassocephalum* complex is in need of a thorough revision.

481 *Sonchus asper* (L.) Hill, Herb. Brit. 1:47 (1769); Andr., F.P.S. 3:50 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:296 (1963); Jeffrey in Kew Bull. 18:481 (1966); Cuf., Enum. 1:186 (1967).

S. oleraceus L. var. *asper* L., Sp. Pl. :794 (1753).

[*S. oleraceus* L. sensu Oliver & Hiern in F.T.A. 3:457 (1877), pro parte. *non* L. (1753).]

DARFUR Jebel Marra, piedmont and massif, 1160-2600 m; arable lands. *Wickens* 1098, 1395 & 2731; *Kassas* 461 & 647 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *kornari*; (Arabic) *umm al laban*. The leaves are soaked in water to remove the bitter taste, then eaten as a salad.

DISTRIBUTION Cameroon, Sudan Republic (Jebel Marra), Ethiopia, Somali Republic, Uganda, Kenya, Tanzania, Transvaal; widely distributed throughout the world.

FLORISTIC CATEGORY Subcosmopolitan.

482 *Sonchus gigas* Boulos ex Humb., Fl. Madag. 3:887 (1963); quoad descr. lat. et typum, excl. descr. gall., *non* Boulos in Bot. Not. 112:365 (1959), *nom. non rite publ.*; Boulos & Jeffrey in Taxon 18:349 (1969); Wickens, For. Bull. 14(N.S.) :30 (1969). *S. gigas* Boulos ex Humb. subsp. *medius* Boulos ex Humb., Fl. Madag. 3:886 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160-2300 m; marshy and arable lands. *Macintosh* 85; *Dandy* 147 (BM!); *Wickens* 1703 & 2165. The leaves are soaked in water to remove the bitter taste, then eaten as a salad.

DISTRIBUTION Sudan Republic (Jebel Marra), Zambia, Transvaal and SW. Africa; also in Madagascar.

FLORISTIC CATEGORY Zambeian Domain and Madagascar Region.

483 *Sphaeranthus angustifolius* DC., Prodr. 5:370 (1836); Ross-Craig in Hook., Icon. Pl. V, 6:56, t.3513A (1954); Andr., F.P.S. 3:53 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:267 (1963).

S. nubicus Schultz Bip. ex Peters, Reise Mossamb. Bot. :418 (1864); Oliver & Hiern in F.T.A. 3:335 (1877); Broun & Massey, F.S. :283 (1929).

DARFUR Lowland plain, 1020 m; shallow depressions. *Wickens* 1132. DISTRIBUTION Senegal to N. Nigeria eastwards to the western central provinces of the Sudan Republic.

FLORISTIC CATEGORY Sahelian Domain.

484 *Sphaeranthus flexuosus* O. Hoffm. in Ann. Mus. Congo IV, 1:1 (1903); Ross-Craig in Hook., Icon. Pl. V, 6:34, t.3505B (1954); Andr., F.P.S. 3:54 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:266 (1963).

S. brounii Robyns in Bull. Misc. Inf. Kew (1924):198 (1924); Broun & Massey, F.S. :283 (1929).

DARFUR Jebel Marra, massif, 1850 m; fallow and upland grassland. *Wickens* 1468.

DISTRIBUTION N. Nigeria and Cameroon eastwards to the western central provinces of the Sudan Republic.

FLORISTIC CATEGORY Sahelian Domain.

485 *Tithonia rotundifolia* (Miller) Blake in Contrib. Gray Herb. n. ser., 52:41 (1917); Wickens, For. Bull. 14(N.S.) :30 (1969).

Tagetes rotundifolia Miller, Gard. Dict. ed. 8, no. 4 (1768).

DARFUR Lowland plain, 1620 m; alluvial soils. *Robertson* 32; *Wickens* 2287. This plant is restricted to a short stretch of the Wadi Aribo and is probably an escape from either the 'Tiger House' Rest House or the District Commissioner's garden nearby. DISTRIBUTION Central America, cultivated as an ornamental elsewhere in the tropics.

FLORISTIC CATEGORY Neotropical cultigen.

486 *Tridax procumbens* L., Sp. Pl. :900 (1753); Hutch. in Bull. Misc. Inf. Kew 1921:381 (1921); Andr., F.P.S. 3:55 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:230, fig. 248 (1963); Cuf., Enum. 1:143 (1967).

DARFUR Jebel Marra, massif, 1770 m; stream bank. *Jackson* 3293. DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique and Zambia; a native of central America, now widespread in tropical Africa. Present in the southern provinces of the Sudan.

FLORISTIC CATEGORY Neotropical, now a pantropical weed.

487 *Vernonia adoensis* Schultz Bip. ex Walp., Repert. 2:946 (1843); Oliver & Hiern in F.T.A. 3:291 (1877).

V. kotschyana Schultz Bip. Walp., Repert. 2:947 (1843); Oliver & Hiern in F.T.A. 3:289 (1877); Broun & Massey, F.S. :278 (1929); Andr., F.P.S. 3:61 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:276 (1963). Cuf., Enum. 1:072 (1966).

V. tenoreana Oliver in Trans. Linn. Soc. 29:92 (1873); Oliver & Hiern in F.T.A. 3:290 (1877); C. D. Adams in F.W.T.A. ed. 2, 2:276 (1963).

V. stenostegia (Stapf) Hutch. & Dalz., F.W.T.A. ed. 1, 2:166 (1931); C. D. Adams in F.W.T.A. ed. 2, 2:276 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160-2300 m; lowland plain 1020 m; savanna and arable lands. *Macintosh* 90; *Wickens* 1391, 2342 & 2973; *Kassas* 454, 461:9, 583 & 659 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *dirruirr*. The roots are used in the treatment of stomach-ache.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

488 *Vernonia amygdalina* Del. in Caillaud, Voy. à Méroë :41 (1826); Oliver & Hiern in F.T.A. 3:284 (1877); Lester-Garland in Journ. Bot. 59:48 (1921). Broun & Massey, F.S. :277 (1929); Andr., F.P.S. 3:59, fig. 10 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:277, fig. 260 (1963); Cuf., Enum. 1:066 (1966).

DARFUR Jebel Marra piedmont and massif, 1160–2450 m; alluvial soils. *Lynes* s.n. & 99; *Wickens* 975 & 1549; *Kassas* 210, 225, 453, 603 & 770 (all KHU & CAI, *n.v.*).
DISTRIBUTION Mali to Cameroon eastwards to Ethiopia and south through E. Africa to Rhodesia and Angola. Widely distributed in the central and southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

489 ***Vernonia galamensis*** (Cass.) Less. in *Linnaea* 4:292 (1829); Cuf., Enum. :1069 (1966).
Centropalus galamensis Cass. in *Dict. Sci. Nat.* 7:383 (1817).
Vernonia pauciflora (Willd.) Less. in *l. c.* (1829); Oliver & Hiern in F.T.A. 3:283 (1877); Broun & Massey, F.S. :277 (1929).
Andr., F.P.S. 3:58 (1956); C.D. Adams in F.W.T.A. ed. 2, 2:280 (1963); Quézel, Dossier 5:126 (1969), *non* Poir. (1817).
DARFUR Lowland plain, 1020–1040 m; savanna. *Wickens* 2293 & 2310.
DISTRIBUTION Senegal to Cameroon eastwards and into Uganda, Kenya and Tanzania. Widespread through the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

490 ***Vernonia perrottetii*** Schultz Bip. ex Walp., *Repert.* 2:947 (1843); Oliver & Hiern in F.T.A. 3:272 (1877); Broun & Massey, F.S. :276 (1929); Andr., F.P.S. 3:57 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:281 (1963); Cuf., Enum. :1074 (1966); Quézel, Dossier 5:126 (1969).
DARFUR Jebel Marra, massif, 1190–1830 m; degraded savanna. *Wickens* 2812; *Kassas* 333 (KHU & CAI, *n.v.*).
DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola. Widespread through the central provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

491 ***Vernonia purpurea*** Schultz Bip. ex Walp., *Repert.* 2:946 (1843); Oliver & Hiern in F.T.A. 3:281 (1877); Broun & Massey, F.S. :276 (1929); Andr., F.P.S. 3:59 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:280 (1963); Cuf., Enum. :1074 (1966); Wickens, *For. Bull.* 14(N.S.):30 (1969).
DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 2725.
DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia and Mozambique. Occurs in the southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

492 ***Vernonia richardiana*** (Kuntze) Pichi-Serm. in *Webbia* 7:349 (1959); Andr., F.P.S. 3:62 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:279 (1963); Cuf., Enum. :1075 (1966).
[*V. myricephala* sensu A. Rich., *Tent. Fl. Abyss.* 1:374 (1848); Oliver & Hiern in F.T.A. 3:296 (1877), *non* DC. (1836).]
Cacalia richardiana Kuntze, *Rev. Gen.* :967 (1891).
DARFUR Jebel Marra, piedmont and massif, 1160–2500 m; upland grassland and stream banks. *Lynes* 163a (BM!); *Macintosh* 16; *Dandy* 178 (BM!); *Jackson* 2598; *Wickens* 1077 & 1265; *Kassas* 260:18, 461:29 & 831 (all KHU & CAI, *n.v.*).
DISTRIBUTION Uplands of Ghana, N. Nigeria and Cameroon eastwards to Ethiopia, Uganda and Kenya (Map 136). Also occurs in the Sudan in the Imatongs.
FLORISTIC CATEGORY Afro-montane.

493 ***Vernonia* ?sp. nov.**
DARFUR Jebel Marra, *Macintosh* 86; Murnei, an occasional to frequent purple-flowered woody perennial growing on cultivated sands of trailing dune, 800 m; *Wickens* 2909.
Near *V. ascheronii* Schultz Bip. ex Schweinf., from which it differs in the woolly indumentum and densely pubescent achenes. More material required.

494 ***Vicoa leptoclada*** (Webb) Dandy ex F. W. Andr., F.P.S. 3:62 (1956); C. D. Adams in F.W.T.A. ed. 2, 2:259 (1963); Cuf., Enum. :1117 (1967).
Imula leptoclada Webb in Hook., *Niger Fl.* :137 (1849).

[*Vicoa auriculata* sensu Oliver & Hiern in F.T.A. 3:362 (1877); Broun & Massey, F.S. :285 (1929), *non* Cass. (1827).]

DARFUR Jebel Marra, piedmont, 1160 m; arable lands. *Wickens* 1036.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola.
FLORISTIC CATEGORY Sudano-Zambezian Region.

Gentianaceae

495 ***Canscora diffusa*** (Vahl) R.Br. ex Roem. & Schultes, *Syst.* 3:301 (1820); Baker & N. E. Brown in F.T.A. 4(1):558 (1903); Broun & Massey, F.S. :300 (1929); Andr., F.P.S. 3:64 (1956); P. Taylor in F.W.T.A. ed. 2, 2:300 (1963).
Gentiana diffusa Vahl, *Symb.* 3:47 (1794).
DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; gallery forest. *Wickens* 1526; *Kassas* 293:29 (KHU & CAI, *n.v.*).
DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Rhodesia and Mozambique; also in tropical Asia and Australia.
FLORISTIC CATEGORY Palaeotropical.

496 ***Swertia abyssinica*** Hochst. in *Flora* 1844:28 (1844); Baker & N. E. Brown in F.T.A. 4(1):578 (1904); Norman in *Journ. Bot.* 62:137 (1924); Broun & Massey, F.S. :300 (1929); Andr., F.P.S. 3:65 (1956); Cuf., Enum. :681 (1960); P. Taylor in F.W.T.A. ed. 2, 2:299 (1963).
S. pumila Hochst. in *l. c.* (1844); Baker & N. E. Brown in F.T.A. 4(1):575 (1903); Cuf., Enum. :682 (1960); **synon. nov.**
S. wojeratensis N. E. Brown in F.T.A. 4(1):577 (1904); Cuf., Enum. :683 (1960); Wickens, *For. Bull.* 14(N.S.):31 (1969); **synon. nov.**
DARFUR Jebel Marra, massif, 1340–2750 m; upland grassland. *Lynes* 129 (BM!); *Macintosh* 115; *Jackson* 3348 & 4065; *Wickens* 1719, 2377, 2415 & 2526; *Kassas* 496 (KHU & CAI, *n.v.*).
DISTRIBUTION Cameroon Mtn., Fernando Po, Sudan Republic (Jebel Marra) and Ethiopia (Map 137).
FLORISTIC CATEGORY Afro-montane.

497 ***Swertia* sp.**
DARFUR Jebel Marra, massif (Tora Tonga), 2575 m; robust, immature herb, moist ash soils. *Wickens* 1728.

Primulaceae

498 ***Asterolinon adoënsis*** Kuntze in *Linnaea* 20:37 (1847); P. Taylor in F.T.E.A. *Primulac.* :9, fig. 3 (1958); Cuf., Enum. :657 (1960); Wickens, *For. Bull.* 14(N.S.):31 (1969); Bizzarri in *Webbia* 24:647, fig. 4, map 7 (1970).
Lysimachia adoënsis (Kuntze) Klatt in *Abh. Naturw. Ver. Hamb.* 4(4):38 (1866); Oliver, F.T.A. 3:489 (1877).
DARFUR Jebel Marra, massif, 1350–2450 m; arable weed. *Wickens* 2423, 2507 & 2698.
DISTRIBUTION Sudan Republic (Jebel Marra and Red Sea Hills), Ethiopia, Uganda, Kenya and Tanzania (Map 138).
FLORISTIC CATEGORY Afro-montane.
Note: Differs from *A. linum-stellatum* (L.) Duby., a Mediterranean species with linear-lanceolate leaves, in having broadly ovate leaves. A genus of two species, closely related to *Lysimachia*, from which it differs in having solitary axillary flowers instead of terminal racemes.

Plumbaginaceae

499 ***Plumbago zeylanica*** L., *Sp. Pl.* :151 (1753); Oliver, F.T.A. 3:486 (1877); Broun & Massey, F.S. :310 (1929); Andr., F.P.S. 3:68, fig. 12 (1956); Cuf., Enum. :660 (1960); Hepper, F.W.T.A. ed. 2, 2:306, fig. 270 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; lowland plain, 900 m; savanna, especially stream banks. *Macintosh* 99 & 100; *Dandy* 63 (BM!); *Robertson* 13; *Wickens* 1184, 1376, 1894 & 2611; *Kassas* 196, 461 & 24 & 931 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *kwai kwai*; (Arabic) *nadian*. DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Transvaal and SW. Africa; widespread in the Old World tropics. Widely distributed throughout the Sudan. FLORISTIC CATEGORY Palaeotropical.

Campanulaceae

500 ***Campanula edulis*** *Forsk.*, Fl. Aegypt.-Arab. :44 (1775); Andr., F.P.S. 3:70 (1956); Cuf., Enum. :1052 (1965). *C. rigidipila* Steud. & Hochst. ex A. Rich., Tent. Fl. Abyss. 2:3 (1851); Hemsley in F.T.A. 3:482 (1877); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :299 (1929). *C. schimperii* Vatke in Linnaea 28:712 (1874); Lester-Garland in Journ. Bot. 59:48 (1921). DARFUR Jebel Marra, massif, 1900–3070 m; upland grassland. *Lynes* s.n. (BM!), 36, 54 & 93b; *Macintosh* 73 & 106; *Sandison* 39, 40, 41 & 42 (all BM!); *Dandy* 91 & 121 (both BM!); *Aglen* 23; *Jackson* 3326; *Robertson* 114; *Jackson* 4064; *Wickens* 1218, 1674, 1722, 2144, & 2372; *Kassas* 408, 495 & 625 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *arute*. DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Uganda, Kenya and Tanzania; also in Arabia (Map 139). FLORISTIC CATEGORY Afro-montane.

500A ***Wahlenbergia erecta*** (*Roth ex Roemer & Schultes*) *Tuyn* in Fl. Males. I, 6:113, fig. 1/h-i (1960); Cuf., Enum. :1054 (1965) pro parte quoad syn.; Thulin, Symb. Bot. Upsal. 21, 1:155, figs. 5/M, 27/A & C & 29/F & G (1975). *Dentella erecta* Roth ex Roemer & Schultes, Syst. Veg. 4:25 (1819). *Cephalostigma erectum* (Roth ex Roemer & Schultes) *Vatke* in Linnaea 38:699 (1874) pro parte quoad syn. & in *l. c.* 40:201 (1876) pro parte; Andr., F.P.S. 3:71 (1956). *Lightfootia arenaria* DC. in Ann. Sci. Nat. Bot. V, 6:329 (1866); Hemsley in F.T.A. 3:472 (1877). [*Cephalostigma hirsutum* sensu Hemsley in F.T.A. 3:472 (1877), *non* Edgew. (1846).] [*C. perrotetii* sensu Andr., F.P.S. 3:71 (1956); Hepper, F.W.T.A. ed. 2, 2:311 (1963) pro parte quoad specim., *non* A.D.C. (1830).] DARFUR Jebel Marra, massif, 1340 m; lowland, 1020 m. *de Wilde* 5342 & 5524a (both WAG, *n.v.*). DISTRIBUTION Nigeria, Sudan (Darfur), Ethiopia and from Tanzania and Malawi to Angola (Map—Thulin *l. c.*, map 5); also in India and Malaysia. FLORISTIC CATEGORY Palaeotropical.

500B ***Wahlenbergia hirsuta*** (*Edgew.*) *Tuyn* in Fl. Males. I, 6:113 (1960); Thulin, Symb. Bot. Upsal. 21, 1:174, figs. 11/N, 12/H, 27/D & 29/A–E (1975). *Cephalostigma hirsutum* *Edgew.* in Trans. Linn. Soc. 20:81 (1846); Hemsley in F.T.A. 3:474 (1877). *Lightfootia hirsuta* (*Edgew.*) *E. Wimm.* ex Hepper in Kew Bull. 15:61 (1961) pro parte; Hepper, F.W.T.A. ed. 2, 2:474 (1963). [*Wahlenbergia erecta* sensu Cuf., Enum. :1954 (1965) pro parte quoad syn., *non* Tuyn (1960).] DARFUR Jebel Marra, massif, 1340 m. *de Wilde* 5524b (WAG, *n.v.*). DISTRIBUTION Senegal to the Cameroon and eastwards to Ethiopia and south through E. Africa to Malawi and Angola; also in Madagascar, India and Nepal. Recorded from the southern provinces of the Sudan. (Map—Thulin *l. c.*, map 4). FLORISTIC CATEGORY Palaeotropical.

Lobeliaceae

501 ***Lobelia senegalensis*** *A. DC.*, Prodr. 7:372 (1839); Hemsley in F.T.A. 3:469 (1877); Andr., F.P.S. 3:74 (1956); Wimmer in F.W.T.A. ed. 2, 2:313 (1963); Cuf., Enum. :1060 (1965). *L. sp.* sensu Lester-Garland in Journ. Bot. 59:48 (1921). *L. trierarchi* *R. Good* in Journ. Bot. 62:139 (1924); Broun & Massey, F.S. :299 (1929). var. ***senegalensis***; Wimmer in Engler, Pflanzenr. IV, 276b, 2:552 (1953). DARFUR Jebel Marra, massif, 1600–3070 m; moist sites. *Lynes* s.n. (BM!) 90, 126 (BM, holotype of *L. trierarchi*!) & 127b (BM!); *Macintosh* 104 & 140; *Sandison* 71 (BM!); *Dandy* 100 (BM!); *Jackson* 3351; *Wickens* 1489, 2667 & 2983. DISTRIBUTION Senegal, Sudan Republic (Jebel Marra), Somalia and Mozambique; species extends into Malawi, Zambia, Rhodesia, Transvaal and SW. Africa. FLORISTIC CATEGORY (of the species): Sudano-Zambezian Region.

Boraginaceae

502 ***Arnebia hispidissima*** (*Sieber ex Lehm.*) *DC.*, Prodr. 10:94 (1846); Baker & Wright in F.T.A. 4(2):56 (1905); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :307 (1929); Andr., F.P.S. 3:76, fig. 15 (1956); Cuf., Enum. :785 (1962); Heine in F.W.T.A. ed. 2, 2:324, fig. 278 (1963); Quézel, Dossier 5:126 (1969). *Lithospermum hispidissimum* *Sieber ex Lehm.*, Icones t.39 (1821). *Arnebia asperima* (*Del.*) *Hutch. & Dalziel*, F.W.T.A. ed. 1, 2:201 (1931); Wickens, For. Bull. 14(N.S.):31 (1969). DARFUR Jebel Marra, piedmont and massif, 1160–2900 m; arable lands, savanna and upland grassland. *Lynes* s.n. & 91; *Rugman* 2; *Macintosh* 43; *Dandy* 117 & 189 (both BM!); *Aglen* 60; *Jackson* 2596; *Robertson* 147; *Pellet* J.178 & J.179; *Wickens* 1027, 1197, 1225, 1730, 2146, 2369, 2404 & 2644; *Kassas* 171, 224, 293:17, 553, 596 & 762 (all KHU & CAI, *n.v.*); *Sahni* 433; *Kamil* 1089. Vernacular name: (Fur) *sakran*. DISTRIBUTION N. Nigeria, Cameroon eastwards to the Somali Republic (Map 140); also Egypt, Arabia and N. India. Widely distributed through the northern and central provinces of the Sudan. FLORISTIC CATEGORY Sahalian and South Arabian Domains and Saharo-Indian Region.

503 ***Cordia abyssinica*** *R.Br.* in Salt., Voy. Abyss. Append. 4:64 (1814); Baker & Wright in F.T.A. 4(2):8 (1905); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :303 (1929); Andr., F.P.S. 3:77 (1956). [*C. holstii* sensu Broun & Massey, F.S. :303 (1929), *non* Gürke (1895).] [*C. africana* sensu Cuf., Enum. :766 (1961); Heine in F.W.T.A. ed. 2, 2:320, fig. 276 (1963); Sahni, Trees N. Sudan :104, fig. 45 (1968); Wickens, For. Bull. 14(N.S.):31 (1969), *non* Lam. (1792).] DARFUR Jebel Marra, piedmont and massif, 1020–2300 m; lowland plain, 950–1020 m; river banks. *Lynes* 67; *Dandy* 77 (BM!); *Robertson* 33; *Francis* 9 & 60; *Kassas* 144, 236 & 683 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *nagno* or *nanyu*; (Arabic) *gambil*. Timber used for furniture. DISTRIBUTION Guinée Republic, N. Nigeria, central and southern provinces of the Sudan Republic, Ethiopia, E. Africa, Malawi, Rhodesia and Angola; also in Arabia, introduced into Madagascar. FLORISTIC CATEGORY Sudano-Zambezian Region. Note: According to White in White & Chapman, Evergreen Forests Malawi :182 (1970), the type specimen of *C. africana* Lam. belongs to the Asiatic species *C. myxa* L., which is widely planted and naturalized in Africa. *Cordia abyssinica* cannot therefore be regarded as a synonym of *C. africana*.

504 **Cynoglossum lanceolatum** Forsk., Fl. Aegypt.-Arab. :41 (1775); Baker & Wright in F.T.A. 4(2):54 (1905); Broun & Massey, F.S. :307 (1929); Andr., F.P.S. 3:78 (1958); Cuf., Enum. :781 (1962); Heine in F.W.T.A. ed. 2, 2:324 (1963). subsp. **lanceolatum**; Brand in Engl., Pflanzenr. 4, 252:139 (1921); Heine in F.W.T.A. ed. 2, 2:324 (1963). DARFUR Jebel Marra, massif, 1350–2750 m; gallery forest, stream banks, arable lands and upland grassland. *Dandy* 148 & 151 (both BM!); *Wickens* 1724, 1725, 1926, 2385 & 2427; *Kassas* 293:24, 599 & 642 (all KHU & CAI, *n.v.*); *Kamil* 1157. Vernacular name: (Arabic) *ab lesseg*.

DISTRIBUTION Liberia to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal; widespread in the old World tropics and subtropics. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

505 **Heliotropium bacciferum** Forsk., Fl. Aegypt.-Arab. :38 (1775); Andr., F.P.S. 3:87 (1956); Cuf., Enum. :772 (1961); Heine in F.W.T.A. ed. 2, 2:322 (1963). *H. undulatum* Vahl, Symb. Bot. 1:13 (1790); Baker & Wright in F.T.A. 4(2):37 (1905); Broun & Massey, F.S. :304 (1929); Quézel, Dossier 5:126 (1969).

H. nubicum Bunge in Bull. Soc. Nat. Mosc. 42(1):330 (1869).

DARFUR Lowland plain, 975 m; alluvial soils. *Wickens* 2948.

DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic; also N. Africa and Arabia across to Pakistan.

Widespread through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sahelian and Southern Arabian Domains and Saharo-Sindian Region.

506 **Heliotropium ovalifolium** Forsk., Fl. Aegypt.-Arab. :38 (1775); Baker & Wright in F.T.A. 4(2):34 (1905); Broun & Massey, F.S. :305 (1929); Andr., F.P.S. 3:85, fig. 20 (1956); Cuf., Enum. :775 (1962); Heine in F.W.T.A. ed. 2, 2:322 (1963). *H. niloticum* A. DC. in DC., Prodr. 9:541 (1845).

DARFUR Lowland plain, 1020 m; wayside. *Wickens* 1793.

DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic and southwards through E. Africa to the Transvaal; also in Arabia and southern Asia to N. Australia. Widespread through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

507 **Heliotropium strigosum** Willd., Sp. Pl. 1:743 (1798); Baker & Wright in F.T.A. 4(2):41 (1905); Broun & Massey, F.S. :304 (1929); Andr., F.P.S. 3:87 (1956); Cuf., Enum. :777 (1962); Heine in F.W.T.A. ed. 2, 2:322 (1963). *H. cordofanum* Hochst. ex DC., Prodr. 9:546 (1845).

DARFUR Lowland plain, 900 m; *Acacia seyal* savanna. *Wickens* 2033.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and SW. Africa; also Egypt and across Arabia to India and Australia. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

508 **Heliotropium supinum** L., Sp. Pl. :130 (1753); Baker & Wright in F.T.A. 4(2):37 (1905); Broun & Massey, F.S. :304 (1929); Andr., F.P.S. 3:85 (1956); Cuf., Enum. :777 (1962); Heine in F.W.T.A. ed. 2, 2:322 (1963).

DARFUR Lowland plain, 1020 m; *Acacia albida* woodland. *Wickens* 1134.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and southwards through E. Africa to the Cape; also in N. Africa, southern Europe and Arabia. Widely distributed through the northern and central provinces.

FLORISTIC CATEGORY Sudano-Zambezian and Mediterranean Regions.

509 **Myosotis abyssinica** Boiss. & Reut. in Boiss., Diagn. Pl. Or., n.s. 1(11):122 (1849); Baker & Wright in F.T.A. 4(2):58 (1905); Hedberg, Symb. Bot. Upsal. 15(1):157 & 315 (1957); Cuf., Enum. :784 (1962); Heine in F.W.T.A. ed. 2, 2:325 (1963); Wickens, For. Bull. 14(N.S.) :31 (1969).

DARFUR Jebel Marra, massif, 2750 m; upland meadow. *Wickens* 2400.

DISTRIBUTION Uplands of Cameroon, Fernando Po, Congo Republic, Sudan Republic (Jebel Marra), Ethiopia, Kenya and Tanzania (Map 141).

FLORISTIC CATEGORY Afro-montane.

510 **Trichodesma africanum** (L.) Lehm., Pl. Asperif. :195 (1818); Baker & Wright in F.T.A. 4(2):48 (1905); Norman in Journ. Bot. 62:137 (1924); Broun & Massey, F.S. :306 (1929); Andr., F.P.S. 3:88, fig. 21 (1956); Cuf., Enum. :770 (1962); Heine in F.W.T.A. ed. 2, 2:323, fig. 277 (1963); Quézel, Dossier 5:126 (1969).

Borago africana L., Sp. Pl. :138 (1753).

[*Trichodesma zeylanicum* sensu Broun & Massey, F.S. :307 (1929), pro parte, *non* R.Br. (1810).]

T. giganteum Quézel in Bull. Soc. Afr. Nord. 48:96 (1957) & Univ. Alger. Inst. Rech. Sahar. Mém. 4:166, pl. 9 (1958) **syn. nov.**

DARFUR Jebel Marra, piedmont and massif, 1090–2300 m;

lowland plain, 945 m; arable lands and rock crevices. *Lynes* 133;

Rugman 9; *Macintosh* 66; *Dandy* 174 (BM!); *Jackson* 2542;

Robertson 109; *Wickens* 1043, 1196, 1842 & 2628; *Kassas* 287,

293:11, 299, 461:1, 464:2 & 749 (all KHU & CAI, *n.v.*).

Vernacular name: (Fur) *arroht*; (Arabic) *harrish*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and southwards through E. Africa to the Cape; also in Libya and through Arabia to India. Found in the Sudan in the Red Sea Hills (in northern and central Sudan *vide* Andr., *l. c.*).

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

Solanaceae

511 **Datura innoxia** Mill., Gard. Dict. ed. 8, No. 5 (1768); Andr., F.P.S. 3:91 (1956); Heine in F.W.T.A. ed. 2, 2:326 (1963); Cuf., Enum. :881 (1963).

[*D. metel* sensu Wright in F.T.A. 4(2):256 (1906); Broun & Massey, F.S. :312 (1929), *non* L. (1753).]

DARFUR Lowland plain, 1020 m; old fallow and waste places.

Wickens 1780 & 2954.

DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic and south to Natal, Transvaal and SW. Africa; a native of S. America, now widespread as a weed of cultivation in the tropics and subtropics of the world. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

512 **Datura stramonium** L., Sp. Pl. :179 (1753); Wright in F.T.A. 4(2):257 (1906); Broun & Massey, F.S. :312 (1929); Andr., F.P.S. 3:91, fig. 22 (1956); Heine in F.W.T.A. ed. 2, 2:326 (1963); Cuf., Enum. :882 (1963); Quézel, Dossier 5:127 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m;

lowland plain, 1050 m; arable lands. *Wickens* 995, 1407 & 2325;

Kassas 343, 619 & 897 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *sikun*; (Arabic) *sakaren*. Seeds poisonous.

DISTRIBUTION Mali to Cameroon eastwards to the Somali Republic southwards to the Cape; widespread through the world. Widely distributed through the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

513 **Physalis angulata** L., Sp. Pl. :183 (1753); Wright in F.T.A. 4(2):248 (1906); Broun & Massey, F.S. :311 (1929); Andr., F.P.S. 3:94 (1956); Heine in F.W.T.A. ed. 2, 2:329 (1963); Quézel, Dossier 5:127 (1969).

DARFUR Lowland plain, 1020 m; arable lands and waste places. *Wickens* 1136.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south to the Cape; a native of S. America now widespread through the tropics. Widespread through the central provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

514 ***Physalis micrantha* Link.** Enum. Pl. Hort. Berol. 1:181 (1821); Heine in F.W.T.A. ed. 2, 2:329 (1963); *Wickens*, For. Bull. 14(N.S.):31 (1969).

[*P. minima* sensu Wright in F.T.A. 4(2):247 (1906); Broun & Massey, F.S.:311 (1929); Andr., F.P.S. 3:94 (1956), *non* L. (1753).]

DARFUR Lowland plain, 1020 m; arable lands.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia; probably throughout the tropics (*vide* Heine, *l. c.*).

Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

515 ***Physalis peruviana* L.**, Sp. Pl. ed. 2, 1:183 (1763); Wright in F.T.A. 4(2):248 (1906); Andr., F.P.S. 3:90 (1956); Heine in F.W.T.A. ed. 2, 2:329 (1963); Cuf., Enum. 859 (1963); *Wickens*, For. Bull. 14(N.S.):32 (1969).

DARFUR Jebel Marra, massif, 1350–1780 m; arable lands.

Wickens 1409; *Kassas* 216 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *furuta*. Fruit edible.

DISTRIBUTION Sierra Leone eastwards to Ethiopia and south to the Cape; a native of S. America, widespread in the tropics, occasionally cultivated and naturalized. Widely cultivated in the Sudan (Cape Gooseberry), sometimes present as an escape.

FLORISTIC CATEGORY Pantropical weed.

516 ***Solanum cerasiferum* Dunal** in DC., Prodr. 13(1):365 (1852); Wright in F.T.A. 4(2):241 (1906); Andr., F.P.S. 3:99 (1956); Heine in F.W.T.A. ed. 2, 2:333 (1963); Cuf., Enum. 864 (1963).

subsp. ***cerasiferum***; Bitter in Fedde, Rep. Beih. 16:283 (1923); Heine in F.W.T.A. ed. 2, 2:333 (1963); *Wickens*, For. Bull. 14(N.S.):32 (1969).

[*S. xanthocarpum* Schrad. var *schraderei* sensu Wright in F.T.A. 4(2):234 (1906); Broun & Massey, F.S.:309 (1929); Andr., F.P.S. 3:99 (1956), *non* Dunal (1852).]

DARFUR Lowland plain, 120–1100 m; fallow lands and waste places. *Lynes* 505; *Wickens* 1748.

DISTRIBUTION N. Nigeria and Cameroon eastwards to Ethiopia. Occurs in the Sudan along the Nile valley.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

517 ***Solanum incanum* L.**, Sp. Pl. 1:188 (1753); Wright in F.T.A. 4(2):238 (1906); Broun & Massey, F.S.:310 (1929); Andr., F.P.S. 3:98, fig. 24 (1956); Heine in F.W.T.A. ed. 2, 332, fig. 281 (1963); Cuf., Enum. 868 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; savanna and arable lands. *Wickens* 1348 & 1835; *Kassas* 263 & 843 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *delge delge* or *tintin* (Arab) *bejem bejem* or *gibbein*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; also through Arabia to India. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

518 ***Solanum indicum* L.**, Sp. Pl. 1:187 (1753); Wright in F.T.A. 4(2):232 (1906), *pro parte*; Heine in F.W.T.A. ed. 2, 2:333 (1963).

subsp. ***distichum* (Thonn.) Bitter** in Fedde, Rep. Beih. 16:13 (1923); Heine in F.W.T.A. ed. 2, 2:333 (1963).

S. distichum Thonn. in Schum., Beskr. Guin. Pl. 1:122 (1827); Wright in F.T.A. 4(2):223 (1906).

S. scalare C. H. Wright in Journ. Linn. Soc. 30:93 (1894) & in F.T.A. 4(2):224 (1906).

[*S. anomalum* sensu Wright in F.T.A. 4(2):233 (1906); Broun & Massey, F.S.:309 (1929); Andr., F.P.S. 3:102 (1956), *non* Thonn. (1827).]

DARFUR Jebel Marra, massif, *c.* 1800m. *Drar* 2181 (CAI!); *Kassas* 338 (KHU & CAI).

DISTRIBUTION Senegal eastwards to the Somali Republic and south to Angola, Transvaal and Natal. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Guineo-Congo Regions.

Note: More material is required in order that the varietal status may be determined.

519 ***Solanum nigrum* L.**, Sp. Pl. 1:186 (1753); Wright in F.T.A. 4(2):218 (1906); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S.:308 (1929); Andr., F.P.S. 3:96 (1956); Heine in F.W.T.A. ed. 2, 2:335 (1963); Cuf., Enum. 874 (1963). *S. nodiflorum* Jacq., Icon. 2.11, t.326 (1788); Wright in F.T.A. 4(2):218 (1906); Broun & Massey, F.S.:308 (1929); Cuf., Enum. 874 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160–2750 m; lowland plain, 1020 m; arable lands, hedgerows, waste places and stream banks. *Lynes* 37 (BM, *n.v.*), 132 & 134; *Macintosh* 62; *Dandy* 135 (BM!); *Wickens* 1044, 1191, 1711, 1776 & 2391; *Kassas* 217, 575, 653 & 858 (all KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic, south through E. Africa to the Cape; widely distributed through the world. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sub-cosmopolitan weed.

Note: The taxonomy of this very critical complex is in need of revision.

520 ***Withania somnifera* (L.) Dunal** in DC., Prodr. 13(1):453 (1852); Wright in F.T.A. 4(2):249 (1906); Lester-Garland in Journ. Bot. 59:48 (1921); Broun & Massey, F.S.:311 (1929); Andr., F.P.S. 3:102, fig. 26 (1956); Heine in F.W.T.A. ed. 2, 2:330 (1963); Cuf., Enum. 857 (1963); Quézel, Dossier 5:127 (1969).

Physalis somnifera L., Sp. Pl. 1:182 (1753).

DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; fallow lands and waste places. *Lynes* s.n. (BM!); *Jackson* 2595; *Wickens* 2108 & 2822; *Kassas* 385 (KHU & CAI, *n.v.*).

DISTRIBUTION Mali, N. Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; also in Madagascar and in N. Africa from the Atlantic Is. and Algeria across Arabia to India. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

Convolvulaceae

521 ***Astripomoea lachnosperma* (Choisy) Meuse** in Bothalia 6:710 (1958); Cuf., Enum. 747 (1961); Verdc., F.T.E.A. Convolv. 77 (1963); Heine in F.W.T.A. ed. 2, 2:343 (1963); *Wickens* For. Bull. 14(N.S.):32 (1969); Quézel, Dossier 5:127 (1969).

Ipomoea lachnosperma Choisy in DC., Prodr. 9:356 (1845); *Astrochlaena lachnosperma* (Choisy) Hall.f. in Engl., Bot. Jahrb. 18:121 (1893); Baker & Rendle in F.T.A. 4(2):119 (1905); Broun & Massey, F.S.:321 (1929); Andr., F.P.S. 3:103, fig. 27 (1956).

A. solanacea Hall.f. in Engl., Bot. Jahrb. 18:121 (1893); Baker & Rendle in F.T.A. 4(2):120 (1905).

DARFUR Jebel Marra, massif, 1550–2050 m; lowland plain, 1020 m; waste places. *Lynes* 130 (BM!) & 570; *Dandy* 81 (BM!); *Wickens* 2068.

DISTRIBUTION Mali to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia, Botswana and SW. Africa.

Widespread through the central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

522 **Astripomoea malvacea** (Klotzsch) Meeuse in Bothalia 6:710 (1958); Cuf., Enum. :747 (1961); Verdc., F.T.E.A. Convolv. :74 (1963); Heine in F.W.T.A. ed. 2, 2:344 (1963). *Breweria malvacea* Klotzsch in Peters, Reise Mossamb. Bot. :245, t.37 (1861). *Astrochlaena malvacea* (Klotzsch) Hall.f. in Engl., Bot. Jahrb. 18:121 (1893); Baker & Rendle in F.T.A. 4(2):121 (1905); Broun & Massey, F.S. :321 (1929); Andr., F.P.S. 3:104 (1956); Quézel, Dossier 5:127 (1969). *A. englerana* Dammer in Engl., Pflanzenw. Ost-Afr. C:330 (1895); Baker & Rendle in F.T.A. 4(2):121 (1905); Broun & Massey, F.S. :321 (1929). *A. stuhlmannii* Hall.f. in Engl., Bot. Jahrb. 30:386 (1901); Baker & Rendle in F.T.A. 4(2):122 (1905). var. **volkensii** (Dammer) Verdc. in Kew Bull. 13:193 (1958); Cuf., Enum. :748 (1961); Verdc., F.T.E.A. Convolv. :76 (1963); Wickens, For. Bull. 14(N.S.) :32 (1969). *Astrochlaena volkensii* Dammer in Engl., Pflanzenw. Ost-Afr. C:331 (1895); Baker & Rendle in F.T.A. 4(2):120 (1905); Broun & Massey, F.S. :321 (1929). *A. phillipsiae* (Bak.) Rendle in F.T.A. 4(2):121 (1905). *A. stuhlmannii* Hall.f. var. *parviflora* Rendle in F.T.A. 4(2):122 (1905); Norman in Journ. Bot. 62:137 (1924). [*A. stuhlmannii* sensu Broun & Massey, F.S. :321 (1929), *non* Hall.f. (1901) sensu stricto.] DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1100 m; savanna. *Lynes* 571; *Wickens* 1088 & 1901. Vernacular name: (Fur) *latuk*. DISTRIBUTION Cameroon eastwards to the Somali Republic and south through E. Africa to Natal and SW. Africa. Occurs in the southern provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian Region.

523 **Cuscuta planiflora** Tenore, Fl. Napolit. 3:250 (1831); Baker & Rendle in F.T.A. 4(2):203 (1906); Verdc. in E. Afr. Agric. Journ. 18:85 (1953); Cuf., Enum. :728 (1961); Verdc., F.T.E.A. Convolv. :9 (1963). var. **planiflora**: Verdc., F.T.E.A. Convolv. :9 (1963); Wickens, For. Bull. 14(N.S.) :32 (1969). *C. planiflora* Tenore var. *mossamedensis* Hiern, Cat. Afr. Pl. Welw. 1:743 (1898); Baker & Rendle in F.T.A. 4(2):203 (1906). [*C. planiflora* sensu Lester-Garland in Journ. Bot. 59:48 (1921); Broun & Massey, F.S. :324 (1929), *pro parte quoad specim.* Jebel Marra.] [*C. sp.* sensu Norman in Journ. Bot. 62:137 (1924).] DARFUR Jebel Marra, massif, 1500–2900 m; parasitic on *Anthospermum pachyrrhizum*; *Campanula edulis*, *Minuartia filifolia*, *Vermifrux abyssinica* and *Crotalaria* sp. *Lynes* s.n., 131, 147a (BM!) & 147b; *Wickens* 1216, 1712, 2649 & 2922; *Kassas* 505 & 581 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *rijil*. DISTRIBUTION Sudan Republic (Jebel Marra), Uganda, Kenya, Tanzania, Zambia, Angola and SW. Africa; also the Mediterranean region and SW. Asia (similarly for the species as a whole). FLORISTIC CATEGORY Mediterranean Region and Palaeotropical.

524 **Evolvulus alsinoides** (L.) L., Sp. Pl. ed. 2, :392 (1762); Baker & Rendle in F.T.A. 4(2):67 (1905); Broun & Massey, F.S. :322 (1929); Andr., F.P.S. 3:109 (1956); Cuf., Enum. :730 (1961); Verdc., F.T.E.A. Convolv. :18 (1963); Heine in F.W.T.A. ed. 2, 2:339 (1963); Quézel, Dossier 5:128 (1969). *Convolvulus alsinoides* L., Sp. Pl. :157 (1753). DARFUR Jebel Marra, foothills and massif, 1400–1780 m; lowland plain, 760–1100 m; waste places. *Lynes* 572; *Macintosh* 94; *Wickens* 1837, 1953; 2778 & 2904; *Kassas* 235 & 848 (both KHU & CAI, *n.v.*). DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and SW. Africa; widespread through the tropics. Widely distributed through the Sudan. FLORISTIC CATEGORY Pantropical weed.

525 **Ipomoea aquatica** Forsk., Fl. Aegypt.-Arab. :44 (1775); Baker & Rendle in F.T.A. 4(2):170 (1905); Broun & Massey, F.S. :316 (1929); Andr., F.P.S. 3:121, fig. 33 (1956); Cuf., Enum. :749 (1961); Verdc., F.T.E.A. Convolv. :120 (1963); Heine in F.W.T.A. ed. 2, 2:349 (1963). DARFUR Lowland plain, 975–1020 m; flood plain. *Wickens* 1113, 1175, 1363 & 2290. DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Angola and SW. Africa; widespread through the tropics. Widely distributed in the Sudan along the Nile and its tributaries. FLORISTIC CATEGORY Pantropical.

526 **Ipomoea arachnosperma** Welw., Apont. :588 (1859); Verdc. F.T.E.A. Convolv. :112 (1963); Wickens, For. Bull. 14(N.S.) :33 (1969). *I. pilosa* (Roxb.) Sweet, Hort. Brit. :289 (1827); Baker & Rendle in F.T.A. 4(2):161 (1905); Broun & Massey, F.S. :315 (1929), *non* Houttuyn (1777); *nom. illegit.* *I. dichroa* (Roem. & Schultes) Choisy in DC., Prodr. 9:364 (1845); Cuf., Enum. :753 (1961), *nom. illegit.* [*I. aitonii* sensu Andr., F.P.S. 3:114 (1956); Heine in F.W.T.A. ed. 2, 2:352 (1963); Quézel, Dossier 5:128 (1969), *non* Lindl. (1836).] DARFUR Jebel Marra, foothills, 1130–1160 m; savanna. *Wickens* 2549 & 2575. DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; also in NW. India. Widely distributed through the central and southern provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambezian Region and Sindian Domain.

527 **Ipomoea asarifolia** (Desr.) Roem. & Schultes, Syst. 4:251 (1819); Cuf., Enum. :750 (1961); Heine in F.W.T.A. ed. 2, 2:348 (1963); Wickens, For. Bull. 14(N.S.) :33 (1969). *Convolvulus asarifolia* Desr. in Lam., Encycl. Méth. Bot. 3:562 (1789). *Ipomoea repens* Lam., Tabl. Encyl. 1:467 (1791); Baker & Rendle in F.T.A. 4(2):172 (1905); Broun & Massey, F.S. :317 (1929); Andr., F.P.S. 3:120 (1956); Quézel, Dossier 5:128 (1969), *non* Roth (1821). DARFUR Lowland plain, 750 m; flood plain. *Wickens* 2929. Vernacular name: (Fur) *latuk*. DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic; also in tropical America and Asia. FLORISTIC CATEGORY Pantropical.

528 **Ipomoea eriocarpa** R.Br., Prodr. :484 (1810); Baker & Rendle in F.T.A. 4(2):136 (1905); Broun & Massey, F.S. :313 (1929); Andr., F.P.S. 3:113 (1956); Verdc., F.T.E.A. Convolv. :91, fig. 22/5 & 24/4 (1963); Heine in F.W.T.A. ed. 2, 2:350 (1963). *I. trematosperma* Choisy in DC., Prodr. 9:367 (1845). *I. leptocaulos* Hall.f. in Engl. Bot. Jahrb. 18:126 (1893); Baker & Rendle in F.T.A. 4(2):140 (1905). *I. morsonii* Baker in Bull. Misc. Inf. Kew 1894:91 (1894); Baker & Rendle in F.T.A. 4(2):140 (1905). DARFUR Jebel Marra, piedmont, 1160 m; fallow lands. *Wickens* 1516. DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and southwards to the Transvaal; also in Madagascar, tropical Asia and northern Australia. Widespread through the Sudan. FLORISTIC CATEGORY Palaeotropical.

529 **Ipomoea involucrata** P. Beauv., Fl. Owaré 2:52, t.89 (1817); Baker & Rendle in F.T.A. 4(2):150 (1905); Broun & Massey, F.S. :315 (1929); Andr., F.P.S. 3:112 (1956); Cuf., Enum. :755 (1961); Verdc., F.T.E.A. Convolv. :104 (1963); Heine in F.W.T.A. ed. 2, 2:347, fig. 283 (1963).

var. **involutocrata**; Verdc., F.T.E.A. Convolv. :104 (1963); Wickens, For. Bull. 14(N.S.) :32 (1969).

DARFUR Lowland plain, 120 m; flood plain. *Wickens* 2500.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and Angola. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

530 ***Ipomoea nil* (L.) Roth**, Cat. Bot. :136 (1797); Andr., F.P.S. 3:119 (1956); Verdc. in Taxon 6:231 (1957) & 7:84 (1958); Cuf., Enum. :757 (1961); Verdc., F.T.E.A. Convolv. :113 (1963); Heine in F.W.T.A. ed. 2, 2:351 (1963). *Convolvulus nil* L., Sp. Pl. ed. 2, :219 (1762).

[*Ipomoea hederacea* sensu auct. mult., eg. Baker & Rendle in F.T.A. 4(2):159 (1905), pro parte; Broun & Massey, F.S. :315 (1929), non Jacq. (1782).]

DARFUR Jebel Marra, massif, 1350 m; lowland plain, 1130–1200 m; savanna. *Lynes* 569; *Wickens* 2323, 2528 & 2529. Flowers sky-blue or white, changing to magenta on drying.

DISTRIBUTION Sierra Leone to Nigeria eastwards to Ethiopia and southwards through E. Africa to Natal and the Transvaal; native of N. America, now widespread through various parts of the tropics. Widely distributed through the Sudan.

FLORISTIC CATEGORY Pantropical weed.

531 ***Ipomoea obscura* (L.) Ker-Gawl.** in Bot. Reg. 3, t.239 (1817); Baker & Rendle in F.T.A. 4(2):164 (1905); Broun & Massey, F.S. :316 (1929); Andr., F.P.S. 3:116 (1956); Cuf., Enum. :758 (1961); Verdc., F.T.E.A. Convolv. :116, fig. 24/1 (1963); Heine in F.W.T.A. ed. 2, 2:349 (1963). var. **obscura**; Verdc., F.T.E.A. Convolv. :116 (1963); Wickens, For. Bull. 14(N.S.) :33 (1969). *Convolvulus obscurus* L., Sp. Pl. ed. 2, :220 (1762).

Ipomoea fragilis Choisy in DC., Prodr. 9:372 (1845); Baker & Rendle in F.T.A. 4(2):165 (1905); Broun & Massey, F.S. :316 (1929); Andr., F.P.S. 3:116 (1956).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1014. DISTRIBUTION Sierra Leone to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; widespread through the tropics of the Old World. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

532 ***Ipomoea ochracea* (Lindl.) G. Don**, Gen. Syst. 4:270 (1837); Baker & Rendle in F.T.A. 4(2):166 (1905), pro parte; Cuf., Enum. :758 (1961); Verdc., F.T.E.A. Convolv. :115 (1963); Heine in F.W.T.A. ed. 2, 2:349 (1963). var. **ochracea**; Verdc., F.T.E.A. Convolv. :115 (1963); Wickens, For. Bull. 14(N.S.) :32 (1969).

Convolvulus ochraceus Lindl. in Bot. Reg. 13, t.1060 (1827).

Ipomoea kentrocarpa A. Rich., Tent. Fl. Abyss. 2:70 (1851); Baker & Rendle in F.T.A. 4(2):163 (1905); Andr., F.P.S. 3:115 (1956).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; river bank. *Wickens* 1165; *Kassas* 252, 273 & 293:10 (all KHU & CAI, n.v.).

DISTRIBUTION Port. Guinea to Cameroon eastwards to Ethiopia and in Uganda, Kenya, Tanzania and Angola. Occurs in the Sudan in Equatoria *vide* Andr., *l. c.* but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambezian Region.

533 ***Ipomoea sinensis* (Desr.) Choisy** in Mém. Soc. Phys. Genève 6:459 (1834); Cuf., Enum. :762 (1961); Verdc., F.T.E.A. Convolv. :100 (1963); Heine in F.W.T.A. ed. 2, 2:349 (1963). *Convolvulus sinensis* Desr. in Lam., Encycl. Méth. Bot. 3:557 (1791). subsp. **blepharosepala** (A. Rich.) Meeuse in Bothalia 6:729 (1958); Verdc., F.T.E.A. Convolv. :101 (1963); Wickens, For. Bull. 14(N.S.) :33 (1969).

I. blepharosepala A. Rich., Tent. Fl. Abyss. 2:72 (1851); Andr., F.P.S. 3:116, fig. 31 (1956); Quézel, Dossier 5:128 (1969).

I. cardiosepala Baker & Wright in Fl. Cap. 4(2):61 (1904); Baker & Rendle in F.T.A. 4(2):147 (1905); Broun & Massey, F.S. :314 (1929), pro parte, non Meisn. (1869).

DARFUR Lowland plain, 1020 m; waste places. *Wickens* 2305.

DISTRIBUTION Northern and central provinces of the Sudan Republic, Ethiopia and Somali Republic southwards to Angola and SW. Africa; also in Socotra and Arabia.

FLORISTIC CATEGORY Sudano-Zambezian Region.

534 ***Ipomoea vagans* Baker** in Bull. Misc. Inf. Kew 1894:70 (1894); Baker & Rendle in F.T.A. 4(2):137 (1905); Andr., F.P.S. 3:113 (1956); Heine in F.W.T.A. ed. 2, 2:349 (1963). *I. sulphurea* Hochst. ex Choisy in DC., Prodr. 9:356 (1845); Baker & Rendle in *l. c.* (1905); Broun & Massey, F.S. :313 (1929), non G. Don (1838).

DARFUR Lowland plain, 1030 m; rock crevices. *Wickens* 2355.

DISTRIBUTION Senegal, Ghana, N. Nigeria and the Sudan Republic (Kordofan and Darfur Provinces).

FLORISTIC CATEGORY Sudanian Domain.

535 ***Ipomoea verbascoides* Choisy** in Mém. Soc. Phys. Genève 8:56 (1838); Baker & Rendle in F.T.A. 4(2):183 (1905); Broun & Massey, F.S. :318 (1929); Andr., F.P.S. 3:120 (1956); Verdc., F.T.E.A. Convolv. :140, fig. 22/11 (1963); Heine in F.W.T.A. ed. 2, 2:348 (1963); Quézel, Dossier 5:128 (1969).

I. dammarana Rendle in Journ. Bot. 34:36 (1896); Baker & Rendle in *l. c.* (1905).

DARFUR Jebel Marra, piedmont and massif, 1160–1980 m; stream banks and rock crevices. *Jackson* 4055; *Wickens* 1279, 1470 & 1807. Vernacular name: (Fur) *amdoot*; (Arabic) *hantut*.

DISTRIBUTION Scattered through N. Nigeria, Cameroon, southern provinces of the Sudan Republic, Uganda, Tanzania, Angola, Botswana and SW. Africa (Map 142).

FLORISTIC CATEGORY Sudanian and Zambezian Domains.

536 ***Ipomoea verticillata* Forsk.**, Fl. Aegypt.-Arab. :44 (1775); Baker & Rendle in F.T.A. 4(2):136 (1905); Broun & Massey, F.S. :313 (1929); Andr., F.P.S. 3:113 (1956); Cuf., Enum. :764 (1961); Heine in F.W.T.A. ed. 2, 2:350 (1963); Quézel, Dossier 5:128 (1969).

DARFUR Lowland plain, 1050 m; *Acacia seyal* savanna. *Wickens* 2285.

DISTRIBUTION Senegal, Mali, N. Nigeria, northern and central provinces of the Sudan Republic, Ethiopia, Somali Republic and Angola.

FLORISTIC CATEGORY Sahelian and Afrotropical Domains.

537 ***Merremia pterygocaulos* (Choisy) Hall.f.** in Engl., Bot. Jahrb. 16:552 (1893) & 18:113 (1893); Baker & Rendle in F.T.A. 4(2):105 (1905); Broun & Massey, F.S. :319 (1929); Andr., F.P.S. 3:124 (1956); Cuf., Enum. :744 (1961); Verdc., F.T.E.A. Convolv. :57 (1963); Heine in F.W.T.A. ed. 2, 2:342 (1963). *Ipomoea pterygocaulos* Choisy in DC., Prodr. 9:381 (1845).

DARFUR Jebel Marra, piedmont and massif, 1160–1600 m; stream bank. *Dandy* 67 (BM!); *Wickens* 996; *Kassas* 281 (KHU & CAI, n.v.).

DISTRIBUTION Gambia to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and Angola; also in Madagascar. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

538 ***Merremia tridentata* (L.) Hall.f.** in Engl., Bot. Jahrb. 16:552 (1893); Baker & Rendle in F.T.A. 4(2):111 (1905); Cuf., Enum. :745 (1961); Verdc., F.T.E.A. Convolv. :51 (1963); Heine in F.W.T.A. ed. 2, 2:341 (1963). subsp. **angustifolia** (Jacq.) van Ooststr. in Blumea 3:323 (1939); Andr., F.P.S. 3:125 (1956); Cuf., Enum. :745 (1961); Verdc., F.T.E.A. Convolv. :51 (1963); Heine in F.W.T.A. ed. 2, 2:341 (1963); Quézel, Dossier 5:128 (1969).

Ipomoea angustifolia Jacq., Ic. Pl. Rar. 2:110, t.317 (1789) & Collect. 2:367 (1789).

Merremia angustifolia (Jacq.) Hall.f. in Engl., Bot. Jahrb. 18:117 (1893); Baker & Rendle in *l. c.* (1905); Broun & Massey, F.S. :320 (1929).

DARFUR Jebel Marra, massif, 1900–2300 m; lowland plain, 800 m; arable lands. *Wickens* 2911; *Kassas* 439, 602 & 668 (all KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon and eastwards to the central and southern provinces of the Sudan Republic (Ethiopia *vide* Cuf., *l. c.* but no specimens seen) and south through E. Africa to the Cape; also in tropical Asia and Australia.

FLORISTIC CATEGORY Palaeotropical.

Scrophulariaceae

539 ***Alectra sessiliflora*** (Vahl) Kuntze., Rev. Gen. 2:458 (1891); Hepper in Kew Bull. 14:404 (1960) & F.W.T.A. ed. 2, 2:367 (1963); Cuf., Enum. :902 (1963).

Gerardia sessiliflora Vahl, Symb. Bot. 3:79 (1794).

var. ***senegalensis*** (Benth.) Hepper in Kew Bull. 14:405 (1960) & F.W.T.A. ed. 2, 2:368 (1963); Cuf., Enum. :902 (1963); Wickens, For. Bull. 14(N.S.) :34 (1969).

Alectra senegalensis Benth. in DC., Prodr. 10:339 (1846); Hemsley & Skan in F.T.A. 4(2):371 (1906).

A. asperima Benth. in DC., Prodr. 10:340 (1846); Hemsley & Skan in F.T.A. 4(2):369 (1906); Andr., F.P.S. 3:120 (1956).

[*A. communis* sensu Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :329 (1929), *non* Hemsley (1906).]

DARFUR Jebel Marra, piedmont and massif, 1160–2700 m; moist sites. *Lynes* 137; *Jackson* 3345; *Wickens* 1066, 1185, 1900, 2450 & 2876; *Kassas* 293:15 (KHU & CAI!).

DISTRIBUTION Uplands of Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi, Zambia, Angola and SW. Africa; also in Madagascar (Map 143). Also found in the Sudan in the Imatongs.

FLORISTIC CATEGORY Afro-montane and Madagascan Regions.

540 ***Bellardia trixago*** (L.) All., Fl. Pedem. 1:61 (1785); Andr., F.P.S. 3:133 (1965); Cuf., Enum. :912 (1963).

Bartsia trixago L., Sp. Pl. :602 (1753); Hemsley & Skan in F.T.A. 4(2):459 (1906).

DARFUR Jebel Marra, massif, 1350–2600 m; stream banks and fallow lands. *Sandison* 61 (BM!); *Wickens* 1716 & 2793; *Kassas* 172, 280 & 360:11 (all KHU & CAI, *n.v.*).

DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra and Imatongs), Ethiopia, Uganda, Kenya and S. Africa; also in the Mediterranean region and Asia Minor (Map 144).

FLORISTIC CATEGORY Afro-montane and Mediterranean Regions.

541 ***Buchnera hispida*** Buch.-Ham. ex D. Don, Prodr. Fl. Nepal. :91 (1825); Hemsley & Skan in F.T.A. 4(2):397 (1906); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :329 (1929); Andr., F.P.S. 3:134 (1956); Hepper, F.W.T.A. ed. 2, 2:369 (1963); Cuf., Enum. :905 (1963).

DARFUR Jebel Marra, piedmont and massif, 1160–2400 m; lowland plain, 1620 m; fallow lands, stream banks, and upland grassland. *Lynes* 140 & 140a (BM!); *Dandy* 79 (BM!); *Jackson* 3366; *Pettet* 174 & 176; *Wickens* 1026, 2764, 2769 & 2779; *Kassas* 388 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia, and south through E. Africa to Mozambique, Rhodesia and Angola; also in Madagascar and India. Also found in the Sudan in the Nuba Mountains and Igessanya Hills.

FLORISTIC CATEGORY Sudano-Zambezian, Madagascan and Deccan Regions.

542 ***Celsia sudanica*** (Murbeck) Wickens in Kew Bull. 24:352 (1970).

C. interrupta Fresen. var. *sudanica* Murbeck, Lunds Univ.

Arsskrift. N.F. Avd. 2, 35(1):57 (1939).

[*C. pedunculosa* sensu Wickens, For. Bull. 14(N.S.) :34 (1969), *non* Steud. & Hochst. ex Benth. (1846).]

DARFUR Jebel Marra, piedmont and massif, 1150–1780 m; savanna. *Macintosh* 71 & 93 (K, syntypes of *C. interrupta* var. *sudanica*!); *Wickens* 1487, 1670, 1832, 2969 & 2998; *Kassas* 878 (KHU & CAI!).

DISTRIBUTION Sudan Republic (Jebel Marra; and Ethiopia (Map 145).

FLORISTIC CATEGORY ?Endemic to Jebel Marra.

Note: When raising *C. sudanica* to specific status I suggested that its affinities were more with *C. scabrata* Skan than with *C. interrupta* Fresen. as suggested by Murbeck (1939). I am now of the opinion that it is closer to *C. pedunculosa* Steud. & Hochst. ex DC., from which it chiefly differs by the presence of a glandular pubescence.

Since the publication of *C. sudanica* I have seen a glandular specimen from Ethiopia (Burger 2084) which appears to be identical with the Jebel Marra specimens. Further collections from Ethiopia are required before the specific status of *C. sudanica* can be reconsidered.

543 ***Craterostigma plantagineum*** Hochst. in Flora 24:669 (1841); Hemsley & Skan in F.T.A. 4(2):329 (1906); Andr., F.P.S. 3:134, fig. 36 (1956); Cuf., Enum. :896 (1963); Quézel, Dossier 5:129 (1969).

[*C. lanceolatum* sensu Wickens, For. Bull. 14(N.S.) :34 (1969), *non* Skan (1906).]

DARFUR Jebel Marra, piedmont and massif, 1150–1525 m; lowland plain 1050–1150 m; gallery forest and stream banks. *Aglen* 66; *Wickens* 1772, 1819 & 2153.

DISTRIBUTION Rare in Niger and Chad *vide* Lebrun, Audru, Gaston & Mosnier, Cat. Pl. Vasc. Tchad Mérid. :166 (1972), Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia and south through E. Africa to Malawi, Rhodesia and Botswana; also in the Yemen (Map 146).

FLORISTIC CATEGORY Afriental, Zambezian and South Arabian Domains.

544 ***Cynium camporum*** Engl., Bot. Jahrb. 18:73 (1893); Hemsley & Skan in F.T.A. 4(2):432 (1906); Broun & Massey, F.S. :332 (1929); Andr., F.P.S. 3:136 (1956); Hepper, F.W.T.A. ed. 2, 2:373 (1963); Cuf., Enum. :906 (1963).

DARFUR Jebel Marra, massif, 1525 m; stony places. *Macintosh* 113; *Aglen* 65; *Wickens* 1935.

DISTRIBUTION Mali to Cameroon eastwards to Ethiopia, Uganda and Kenya. Widespread in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

545 ***Kickxia aegyptiaca*** (L.) Náhlek in Publ. Fac. Sci. Univ. Masaryk, Brno 70:30 (1926); Wickens in Kew Bull. 30:11 (1975). *Antirrhinum aegyptiacum* L., Sp. Pl. :613 (1753).

Linaria aegyptiaca (L.) Dum.-Cours., Bot. Cult. ed. 1, 2:92 (1802); Hepper, F.W.T.A. ed. 2, 2:354 (1963).

subsp. ***virgata*** Wickens in Kew Bull. 25:377, fig. 2 (1971) & 30:14 (1975).

[*L. aegyptiaca* sensu Lester-Garland in Journ. Bot. 59:48 (1921);

Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S.

:325 (1929); Wickens, For. Bull. 14(N.S.) :34 (1969), *non* (L.);

Dum.-Cours. sensu stricto.]

[*L. bentii* sensu Quézel, Dossier 5:129 (1969), *non* Skan (1906).]

DARFUR Jebel Marra, piedmont and massif, 1160–2900 m; arable lands and upland grassland. *Lynes* s.n. BM!, & 54d BM!; *Macintosh* 50; *Sandison* 15, 16, 17 & 70 (all BM!); *Dandy* 80 & 93 (both BM!); *Aglen* 61; *Jackson* 2538, 2594 & 3340; *Robertson* 129 (K holotype!); *Wickens* 1025, 1037, 1229, 1404, 1690 & 2374; *Kassas* 127, 284, 406, 532, 692 & 811 (all KHU & CAI, *n.v.*), 471, 531 & 611 (all KHU & CAI!); *Kamil* 1094.

DISTRIBUTION (subspecies) endemic to Jebel Marra; (species) Sudan Republic, N. Africa, Sahara mountains; also Arabia and Asia Minor (Map—Wickens *l. c.*, map 1 (1975)).

FLORISTIC CATEGORY (subspecies) endemic to Jebel Marra; (species) Mediterranean region and Saharo-montane.

546 **Kickxia dibolophylla** *Wickens* in Kew Bull. 25:377, fig. 1 (1971).

[*Linaria somalensis* sensu Norman in Journ. Bot. 62:138 (1924), *non* Vatke (1882).]

DARFUR Jebel Marra, massif, 1525–2450 m; stream banks. *Lynes* 139 a & b (both BM!); *Macintosh* 12; *Steele* 12; *Pettet* 188 (K. holotype!).

DISTRIBUTION Restricted to Jebel Marra.

FLORISTIC CATEGORY Endemic to Jebel Marra.

547 **Lindernia numulariifolia** (*D. Don*) *Wettst.* in Engl. & Prantl, Pflanzenfam. 4.3B:79 (1891); *Hemsley & Skan* in F.T.A. 4(2):341 (1906); *Hepper*, F.W.T.A. ed. 2, 2:364 (1963); *Cuf.*, Enum. :897 (1963); *Wickens*, For. Bull. 14(N.S.):34 (1969). *Vandellia numulariifolia* *D. Don*, Prodr. Fl. Nepal, :86 (1825).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1050 m; moist rocks. *Wickens* 2060 & 2120.

DISTRIBUTION Sierra Leone, Nigeria, Cameroon across to the Sudan Republic (Darfur and the Lotti Forest) and Ethiopia and south through E. Africa to Zambia and Angola; also in tropical Asia.

FLORISTIC CATEGORY Palaeotropical.

548 **Lindernia oliverana** *Dandy ex F. W. Andr.*, F.P.S. 3:139 (1956); *Hepper*, F.W.T.A. ed. 2, 2:364 (1963); *Cuf.*, Enum. :897 (1963).

[*Vandellia lobelioides* sensu *Oliver* in Trans. Linn. Soc. 29:120, t.121B (1875); *non* *F. Muell.* (1858).]

Lindernia lobelioides (*Oliver*) *Wettst.* in Engl. & Prantl, Pflanzenfam. 4.3B:80, fig. 36A,B (1891); *Hemsley & Skan* in F.T.A. 4(2):340 (1906); *Broun & Massey*, F.S. :328 (1929), *non* *F. Muell.* (1882).

DARFUR Jebel Marra, massif, 1980 m; marshy ground. *Lynes* 29a & 127a (both BM!).

DISTRIBUTION N. Nigeria (Jos plateau), southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to Rhodesia.

FLORISTIC CATEGORY Sudano-Zambezian Region.

549 **Mimulus gracilis** *R. Br.*, Prodr. :439 (1810); *Hemsley & Skan* in F.T.A. 4(2):310 (1906); *Norman* in Journ. Bot. 62:138 (1924); *Broun & Massey*, F.S. :327 (1929); *Andr.*, F.P.S. 3:140 (1956); *Hepper*, F.W.T.A. ed. 2, 2:357 (1963); *Cuf.*, Enum. :893 (1963).

DARFUR Jebel Marra, massif, 1600–2375 m; moist sites. *Lynes* 141; *Macintosh* 132; *Steele* s.n.; *Dandy* 162 (BM!); *Jackson* 3379; *Wickens* 1474, 2696 & 2989.

DISTRIBUTION N. Nigeria (Jos Plateau), Sudan Republic (Jebel Marra), Ethiopia, Tanzania, Malawi, Mozambique, Zambia, Rhodesia and Angola; also in southern Asia and N. Australia.

FLORISTIC CATEGORY Palaeotropical.

550 **Misopates orontium** (*L.*) *Raf.*, Autikon Botanikon :158 (1840); *Andr.*, F.P.S. 3:140 (1956); *Cuf.*, Enum. :891 (1963). *Antirrhinum orontium* *L.*, Sp. Pl. :617 (1753); *Hemsley & Skan* in F.T.A. 4(2):294 (1906); *Norman* in Journ. Bot. 62:138 (1924); *Broun & Massey*, F.S. :326 (1929).

DARFUR Jebel Marra, massif, 1900–2500 m; arable lands, rock crevices and upland grassland. *Lynes* 135; *Sandison* 4, 5, 6 & 7 (all BM!); *Wickens* 2460, 2597, 2625, & 2661; *Kassas* 572, 632 & 690 (all KHU & CAI, n.v.).

DISTRIBUTION Sudan Republic (Jebel Marra and Red Sea Hills), Ethiopia, E. Africa, Malawi and Angola; also N. Africa from Morocco to Egypt and across to India and in Europe (Map 147).

FLORISTIC CATEGORY Palaearctic.

551 **Parentucellia latifolia** (*L.*) *Caruel* in Parl., Fl. Ital. 6:480 (1885).

Euphrasia latifolia *L.*, Sp. Pl. :604 (1753).

Bartsia latifolia (*L.*) *Sibth. & Smith*, Fl. Graec. 6:69, t.586 (1826).

Eufragia latifolia (*L.*) *Griseb.* var. *flaviflora* *Boiss.*, Fl. Or. 4:473 (1879).

Parentucellia latifolia (*L.*) *Caruel* var. *flaviflora* (*Boiss.*) *Dandy ex F. W. Andr.*, F.P.S. 3:140 (1956), **synon. nov.**

DARFUR Jebel Marra, massif, 2700–3000 m, upland grassland.

Sandison 52, 53 and 54 (all BM!); *Dandy* 108 (BM!).

DISTRIBUTION Sudan Republic (Jebel Marra), southern and central Europe and Asia Minor to Baluchistan and Afghanistan (Map 148).

FLORISTIC CATEGORY Mediterranean, central European and Irano-Turanian Regions.

552 **Rhamphicarpa fistulosa** (*Hochst.*) *Benth.* in DC., Prodr.

10:504 (1846); *Hemsley & Skan* in F.T.A. 4(2):419 (1906);

Broun & Massey, F.S. :331 (1929); *Andr.*, F.P.S. 3:140 (1956);

Hepper, F.W.T.A. ed. 2, 2:370 (1963); *Cuf.*, Enum. :907 (1963).

Macrosiphon fistulosus *Hochst.* in Flora 24:374 (1841).

DARFUR Jebel Marra, piedmont, 1160 m; marshy ground. *Wickens* 2956.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Angola and the Transvaal; also in Madagascar. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

553 **Scoparia dulcis** *L.*, Sp. Pl. :116 (1753); *Hemsley & Skan* in F.T.A. 4(2):354 (1906); *Broun & Massey*, F.S. :329 (1929); *Andr.*, F.P.S. 3:141 (1956); *Hepper*, F.W.T.A. ed. 2, 2:356 (1963); *Quézel*, Dossier 5:129 (1969).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020–1100 m; arable lands and marshy places. *Lynes* 579; *Wickens* 1789 & 2262.

DISTRIBUTION Mauritania to Cameroon and Gabon eastwards to Ethiopia and south through E. Africa to Mozambique, Zambia and Angola; widespread through the tropics. Widespread in the southern provinces of the Sudan and in the Nuba Mountains.

FLORISTIC CATEGORY Pantropical.

554 **Scrophularia arguta** *Solander* in Aiton, Hort. Kew. ed. 1, 2:342 (1789); *Hemsley & Skan* in F.T.A. 4(2):296 (1906); *Broun & Massey*, F.S. :325 (1929); *Andr.*, F.P.S. 3:142 (1956); *Cuf.*, Enum. :892 (1963).

DARFUR Jebel Marra, massif, 2300 m; dry stone wall. *Wickens* 2650.

DISTRIBUTION Sudan Republic (Jebel Marra and Red Sea Hills), Ethiopia; also in Spain and N. Africa from Morocco to Egypt and into Arabia (Map 149).

FLORISTIC CATEGORY Mediterranean Region and Afrotropical and South Arabian Domains.

555 **Sopubia ramosa** (*Hochst.*) *Hochst.* in Flora 27:27 (1844); *Hemsley & Skan* in F.T.A. 4(2):449 (1906); *Norman* in Journ. Bot. 62:138 (1924); *Broun & Massey*, F.S. :332 (1929); *Andr.*, F.P.S. 3:142 (1956); *Hepper*, F.W.T.A. ed. 2, 2:369 (1963); *Cuf.*, Enum., :903 (1963).

Raphidophyllum ramosum *Hochst.* in Flora 24:668 (1841).

DARFUR: Jebel Marra, piedmont and massif, 1160–2750 m; savanna and upland grassland. *Lynes* 138, 138a (BM!) & 138b; *Jackson* 2624; *Robertson* 130; *Pettet* 190; *Wickens* 2810; *Kassas* 260, 290 & 535 (all KHU & CAI, n.v.).

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Zambia and Angola. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

556 **Striga asiatica** (*L.*) *Kuntze*, Rev. Gen. 2:466 (1891); *Andr.*, F.P.S. 3:145 (1956); *Hepper*, F.W.T.A. ed. 2, 2:372 (1963); *Cuf.*, Enum. :909 (1963).

Buchnera asiatica *L.*, Sp. Pl. :630 (1753).

Striga lutea *Lour.*, Fl. Cochinch. :22 (1790); *Hemsley & Skan* in F.T.A. 4(2):409 (1906); *Broun & Massey*, F.S. :331 (1929).

DARFUR Jebel Marra, foothills, 1130 m; lowland plain, 1020–1100 m; savanna. *Lynes* 578; *Wickens* 2099 & 2241.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal; also in Arabia, Mascarenes and tropical Asia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

557 **Striga hermonthica** (*Del.*) *Benth.* in Hook., *Comp. Bot. Mag.* 1:365 (1836); Hemsley & Skan in *F.T.A.* 4(2):407 (1906); Broun & Massey, *F.S.* :330 (1929); Andr., *F.P.S.* 3:145, fig. 38 (1956); Hepper, *F.W.T.A.* ed. 2, 2:372, fig. 290 (1963); Cuf., *Enum.* :910 (1963).

Buchnera hermonthica Del., *Fl. Aegypt.* :245, t.34, fig. 3 (1813). *Striga senegalensis* Benth. in DC., *Prodr.* 10:502 (1846); Hemsley & Skan in *F.T.A.* 4(2):408 (1906); Broun & Massey, *F.S.* :330 (1929); Andr., *F.P.S.* 3:145 (1956).

DARFUR Jebel Marra, massif, 1780 m; lowland plain, 1020 m; fallow and cultivated lands. *Lynes* 576; *Macintosh* 138 & 139; *Robertson* 31; *Wickens* 2492. Vernacular name: (Fur) *dalim*; (Arabic) *buda*.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Angola and SW. Africa; also in Egypt, Arabia and Madagascar. Widespread through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

558 **Striga macrantha** (*Benth.*) *Benth.* in DC., *Prodr.* 10:503 (1846); Hemsley & Skan in *F.T.A.* 4(2):413 (1906); Hepper, *F.W.T.A.* ed. 2, 2:371 (1963).

Buchnera macrantha Benth. in Hook., *Comp. Bot. Mag.* 1:366 (1836). **DARFUR** Jebel Marra, piedmont and massif, 1160–1350 m; savanna. *Wickens* 1562 & 2807.

DISTRIBUTION Senegal to Cameroon, Sudan Republic (Jebel Marra) and Angola.

FLORISTIC CATEGORY Sudanian Domain.

559 **Striga passargei** *Engl.*, *Bot. Jahrb.* 23:515, t.12, figs. M. & N. (1897); Hepper, *F.W.T.A.* ed. 2, 2:372 (1963); Wickens, *For. Bull.* 14(N.S.) :35 (1969).

DARFUR Lowlands plain, 1020–1050 m; savanna, shallow soils. *Wickens* 2063, 2306, 2332 & 2345.

DISTRIBUTION Senegal, Ghana, Cameroon, Sudan Republic (Darfur and Blue Nile) and Tanzania.

FLORISTIC CATEGORY Sudanian Domain.

560 **Verbascum sinaiticum** *Benth.* in DC., *Prodr.* 10:236 (1846); Andr., *F.P.S.* 3:147 (1956); Cuf., *Enum.* :884 (1963); Quézel, *Dossier* 5:129 (1969).

V. erianthum Benth. in *op. cit.* :235 (1846); Hemsley & Skan in *F.T.A.* 4(2):280 (1906), in note.

V. ternacha Hochst. ex A. Rich., *Tent. Fl. Abyss.* 2:108 (1851); Hemsley & Skan in *F.T.A.* 4(2):279 (1906); Norman in *Journ. Bot.* 62:138 (1924); Broun & Massey, *F.S.* :324 (1929).

?*V. nubicum* Murbeck, *Lunds Univ. Årsskrift* N.F. 29, No. 2 (Monogr. Verb.) :293, fig. 13, t.12 (1933); Andr., *F.P.S.* 3:149, fig. 39 (1956). The available material is too poor for proper comparison.

DARFUR Jebel Marra, massif, 1700–2300 m; upland grassland and fallow lands. *Lynes* 20a & b; *Macintosh* 36 & 64; *Steele* 36; *Dandy* 175 (BM!); *Aglen* 44; *Jackson* 2571 & 3305; *Francis* 61; *Robertson* 141; *Wickens* 1209 & 2604; *Kassas* 158, 293:23 & 551 (all KHU & CAI!); *Sahni* 445. Vernacular name: (Arabic) *gamsha*. The leaves are used as a substitute for tobacco; the seeds are used for flavouring soup.

DISTRIBUTION Sudan Republic (Jebel Marra and in the Red Sea Hills if *V. nubicum* should prove to be synonymous), Ethiopia and Kenya; also in Arabia, the Near East and across to Afghanistan (Map 150).

FLORISTIC CATEGORY Afro-montane Region and Eastern Mediterranean and Iranean Domains.

Note: The genera *Verbascum* and *Celsia* of Linnaeus were originally separated by the presence of five stamens in *Verbascum* and four in *Celsia*. Taxa with four stamens and a staminode have been inconsistently assigned to either genus. Many authors prefer to treat the two genera under *Verbascum* (see Ferguson in *Bot. Journ. Linn. Soc.* 64:229 (1971)).

As the necessary new combinations have not yet been made for the African species of *Celsia*, the genus is being maintained for the purposes of this paper.

561 **Veronica anagallis-aquatica** *L.*, *Sp. Pl.* :12 (1753); Hemsley & Skan in *F.T.A.* 4(2):357 (1906); Lester-Garland in *Journ. Bot.* 59:48 (1921); Norman in *Journ. Bot.* 62:138 (1924); Broun & Massey, *F.S.* :329 (1929); Andr., *F.P.S.* 3:149 (1956); Cuf., *Enum.* :899 (1963).

[*V. beccabunga* sensu Wickens, *For. Bull.* 14 (N.S.) :35 (1969), *non L.* (1753).]

DARFUR Jebel Marra, piedmont and massif, 1160–2580 m; stream banks and marshy places. *Lynes* s.n. & 15a (both BM!), 16b & 136; *Macintosh* 6, 91 & 92; *Dandy* 150 (BM!); *Jackson* 2539, 2619, & 3282; *Wickens* 991, 1633, 1677, 2631 & 2839; *Kassas* 597, 707 & 820 (all KHU & CAI, *n.v.*); *Kamil* 1203.

DISTRIBUTION Northern provinces of the Sudan Republic, Ethiopia and south through E. Africa to Malawi; also in N. Africa, Europe, Near East, Asia and the Americas.

FLORISTIC CATEGORY Subcosmopolitan.

Orobanchaceae

562 **Orobanche ramosa** *L.*, *Sp. Pl.* :633 (1753); Stapf in *F.T.A.* 4(2):465 (1906); Broun & Massey, *F.S.* :333 (1929); Andr., *F.P.S.* 3:150 (1956); Graham, *F.T.E.A. Orobanch.* :3, fig. 1 (1957), incl. vars. *ramosa* & *brevispicata* (Ledeb.) Graham; Hepper, *F.W.T.A.* ed. 2, 2:374 (1963); Cuf., *Enum.* :921 (1963).

DARFUR Jebel Marra massif, 17800–2400 m; lowland plain, 1020 m; parasitic on *Acacia albida*, *Nicotiana rustica* and *Leucas martinicensis*. *Jackson* 3332; *Wickens* 1152, 1154, 1155, 1332, 2457, 2656, 2712 & 2765.

DISTRIBUTION Mali, Sudan Republic (Darfur, Khartoum and the Red Sea Hills), Ethiopia, Somali Republic, Kenya, Tanzania; also central Europe, Mediterranean area eastwards to the Himalayas; probably introduced into Africa and America.

FLORISTIC CATEGORY Subcosmopolitan weed.

Lentibulariaceae

563 **Utricularia gibba** *L.*, *Sp. Pl.* :18 (1753).

subsp. *exoleta* (*R. Br.*) *P. Taylor* in *Mitt. Bot. Staatss. München* 4:101 (1961); *P. Taylor* in *F.W.T.A.* ed. 2, 2:381 (1963) & in *Kew Bull.* 18:204, figs. 83 & 84 (1964); Wickens, *For. Bull.* 14(N.S.) :35 (1969); *P. Taylor* in *Fl. Afr. Centr. Lentib.* :52 (1972) & *F.T.E.A. Lentib.* :22 (1973).

U. exoleta *R. Br.*, *Prodr.* :430 (1810); Stapf in *F.T.A.* 4(2):495 & 575 (1906); Broun & Massey, *F.S.* :334 (1929); Andr., *F.P.S.* 3:154 (1956); Cuf., *Enum.* :923 (1963).

DARFUR Jebel Marra, foothills, 1675 m; aquatic. *Wickens* 1488. **DISTRIBUTION** Senegal eastwards to Ethiopia and southwards to the Cape; also Portugal, N. Africa, Madagascar, tropical Asia and northern Australia. Widely scattered through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

564 **Utricularia stellaris** *L.f.*, *Suppl.* :86 (1781); Stapf in *F.T.A.* 4(2):488 (1906); Broun & Massey, *F.S.* :334 (1929); Andr., *F.P.S.* 3:154, fig. 41 (1956), pro parte, excl. syn. *U. incerta* Kam.; *P. Taylor* in *Fl. Afr. Centr. Lentib.* :42, pl. 11/6–11 & 13 (1972) & *F.T.E.A. Lentib.* :16 (1973).

U. inflexa Forsk. var. *stellaris* (L.f.) P. Taylor in Mitt. Bot. Staats. München 4:96 (1961); P. Taylor in F.W.T.A. ed. 2, 2:380 (1963) & in Kew Bull. 18:189, fig. 77/6-11 (1964); Cuf., Enum. :924 (1963); Wickens, For. Bull. 14(N.S.) :35 (1969).
 DARFUR Lowland plain, 1020 m; aquatic. *Wickens* 1359.
 DISTRIBUTION Mauritania eastwards to the Somali Republic and south to the Cape; also in tropical Asia and northern Australia. Widely scattered through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Palaeotropical.

Bignoniaceae

565 ***Kigelia africana*** (Lam.) Benth. in Hook., Fl. Nigrit. :463 (1849); Sprague in F.T.A. 4(2) :536 (1906); Heine in F.W.T.A. ed. 2, 2:385, fig. 294 (1963); Cuf., Enum. :915 (1963); Innamorati in Webbia 25:589 (1971).
Bignonia africana Lam., Encycl. 1:424 (1785).
Kigelia aethiopica Decne. in Del., Ic. Select. Pl. 5:39, t.93 (1845); Sprague in F.T.A. 4(2) :538 (1906); Broun & Massey, F.S. :335 (1929).
K. aethiopica Decne, var. *abyssinica* (A. Rich.) Sprague in l. c. (1906); Broun & Massey, F.S. :335 (1929).
K. aethiopum (Fenzl) Dandy ex F. W. Andr., F.P.S. 3:156, fig. 42 (1956).
 DARFUR Lowland plain, 1020–1070 m; *Acacia albida* woodland. *Wickens* 1318 & 1365. Vernacular name: (Fur) *kussul*, pl. *kussula*; (Arabic) *umm mashatur* or *abu shatur*. The powdered fruit is used as a poultice for human breasts.
 DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa (Map—Innamorati l. c. Figs. 1 & 2). Widely distributed in the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian and Guineo-Congo Regions.

566 ***Stereospermum kunthianum*** Cham. in Linnaea 7:721 (1832); Sprague in F.T.A. 4(2) :518 (1906); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :335 (1929); Andr., F.P.S. 3:158, fig. 43 (1956); Heine in F.W.T.A. ed. 2, 2:386, fig. 295 (1963); Cuf., Enum. :914 (1963); Sahni, Trees N. Sudan :106, fig. 46 (1968).
 DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; lowland plain, 1020 m; savanna. *Lynes* s.n., s.n. (BM!) & 75; *Drar* 2090 (CAI!); *Francis* 44; *Wickens* 1176; 1422 & 1580; *Kassas* 152 (KHU & CAI!); *Kamil* 1071. Vernacular name: (Fur) *meggeh derreh*; (Arabic) *khash khash*.
 DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi. Widely distributed through the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian region.

Pedaliaceae

567 ***Ceratotheca sesamoides*** Endl. in Linnaea 7:5, figs. 1 & 2 (1832); Stapf in F.T.A. 4(2) :563 (1906); Broun & Massey, F.S. :337 (1929); Bruce, F.T.E.A. Pedaliac. :14, fig. 6 (1953); Andr., F.P.S. 3:160 (1956); Heine in F.W.T.A. ed. 2, 2:391 (1963); Quézel, Dossier 5:129 (1969).
 DARFUR Lowland plain, 1100 m; *Lynes* 580.
 DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic and south through East Africa to Mozambique and Rhodesia and SW. Africa.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

568 ***Sesamum angustifolium*** (Oliver) Engl., Pflanzenw. Ost-Afr. C:365 (1895); Stapf in F.T.A. 4(2) :554 (1906); Broun & Massey, F.S. :336 (1929); Bruce, F.T.E.A. Pedaliac. :19, fig. 7/9-16 (1953); Andr., F.P.S. 3:163 (1956); Heine in F.W.T.A. ed. 2, 2:391 (1963); Quézel, Dossier 5:130 (1969).

S. indicum L. var. *angustifolium* Oliver in Trans. Linn. Soc. 29:131 (1875).
 DARFUR Lowland plain, 1020–1100 m; alluvial soils. *Lynes* 581; *Robertson* 29; *Wickens* 1959.
 DISTRIBUTION Nigeria and Cameroon eastwards to the central and southern provinces of the Sudan Republic and south through E. Africa to Mozambique, Rhodesia and SW. Africa.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

569 ***Sesamum indicum*** L., Sp. Pl. :634 (1753); Stapf in F.T.A. 4(2) :558 (1906); Broun & Massey, F.S. :336 (1929); Bruce, F.T.E.A. Pedaliac. :17, fig. 7/4-8 (1953); Andr., F.P.S. 3:160 (1956); Heine in F.W.T.A. ed. 2, 2:391 (1963); Cuf., Enum. :918 (1963); Quézel, Dossier 5:130 (1969).
 DARFUR Lowland plain, 1100 m; arable lands. *Lynes* 582.
 Vernacular name: (Fur) *kurta* or *karta*; (Arabic) *simsim*.
 Cultivated for its oil.
 DISTRIBUTION Cultivated in Europe, Asia, Africa and central America; naturalized in many parts of the tropics. Cultivated throughout the Sudan.
 FLORISTIC CATEGORY Pantropical cultigen.

Acanthaceae

570 ***Asystasia gangetica*** (L.) T. Anders. in Thwaites, Enum. Pl. Zeyl. :235 (1860); Andr., F.P.S. 3:166 (1956); Heine in F.W.T.A. ed. 2, 2:413 (1963); Cuf., Enum. :956 (1964).
Justicia gangetica L., Amoen. Acad. 4:299 (1759).
Asystasia coromandeliana Nees in Wall., Pl. As. Rar. 3:89 (1832); C. B. Clarke in F.T.A. 5:131 (1899), excl. syn. *A. calycina* Benth.; Broun & Massey, F.S. :343 (1929).
 DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1020–1100 m; rocky places. *Lynes* 588; *Wickens* 1654 & 2085.
 DISTRIBUTION Senegal eastwards to the Somali Republic and southwards to the Cape; also in Arabia and tropical Asia, introduced into tropical America. Occurs in the southern provinces of the Sudan.
 FLORISTIC CATEGORY Palaeotropical.

571 ***Blepharis linariifolia*** Pers., Syst. 2:180 (1860); C. B. Clarke in F.T.A. 5:100 (1899); Broun & Massey, F.S. :340 (1929); Andr., F.P.S. 3:171, fig. 47 (1956); Heine in F.W.T.A. ed. 2, 2:410 (1963); Cuf., Enum. :952 (1964); Quézel, Dossier 5:130 (1969).
 [B. *dichotoma* sensu Wickens, For. Bull. 14(N.S.) :36 (1969), non Engl. (1889).]
 DARFUR Lowland plain, 1020–1100 m; savanna. *Lynes* 586; *Wickens* 2313. Vernacular name : (Fur) *marr marr*; (Arabic) *begheil*.
 DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through E. Africa to Botswana and SW. Africa. Widely distributed through the central provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

572 ***Blepharis maderaspatensis*** (L.) Heyne ex Roth, Nov. Sp. Ind. Or. :320 (1821); Napper in Kew. Bull. 24:323 (1970).
Acanthus maderaspatensis L., Sp. Pl. :639 (1753) & Syst. Veg. 12:427 (1767).
 subsp. ***rubrifolia*** (Schumach.) Napper in Kew Bull. 24:325, fig. 1/3 (1970).
Blepharis rubrifolia Schumach., Beskr. Guin. Pl. :292 (1827) as '*rubiaefolia*'.
 [B. *boerhaaviifolia* sensu C. B. Clarke in F.T.A. 5:96 (1899); Broun & Massey, F.S. :340 (1929), pro parte, non Pers (1807).]
 [B. *maderaspatensis* sensu Andr., F.P.S. 3:171 (1956); Heine in F.W.T.A. ed. 2, 2:410 (1963); Cuf., Enum. :952 (1964); Quézel, Dossier 5:130 (1969), pro parte.]
 DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1086 & 1653.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa (the species extends into India). Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

573 **Dyschoriste perrottetii** (Nees) Kuntze, Rev. Gen. 2:486 (1891); C. B. Clarke in F.T.A. 5:72 (1899); Broun & Massey, F.S. :339 (1929); Andr., F.P.S. 3:173 (1956); Heine in F.W.T.A. ed. 2, 2:404 (1963); Cuf., Enum. :934 (1964).

Calophanes perrottetii Nees in DC., Prodr. 11:111 (1847).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1084 & 1175.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

574 **Dyschoriste radicans** Nees in DC., Prodr. 11:106 (1847); C. B. Clarke in F.T.A. 5:73 (1899); Cuf., Enum. :935 (1964); Wickens, For. Bull. 14(N.S.) :36 (1969); Quézel, Dossier 5:130 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; savanna, upland grassland and arable lands. *Drar* 2203 (CAI!); *Wickens* 1448, 1671, 2157, 2430 & 2874.

DISTRIBUTION Sudan Republic (Jebel Marra and Red Sea Hills), Ethiopia and Somali Republic southwards through E. Africa to Rhodesia, Botswana and Angola.

FLORISTIC CATEGORY Afriental and Zambezian Domains.

575 **Hygrophila abyssinica** (Hochst. ex Nees) T. Anders. in Journ. Linn. Soc. 7:22 (1863); Heine in Kew Bull. 16:174 (1962) & in F.W.T.A. ed. 2, 2:395 (1963); Cuf., Enum. :930 (1964); Wickens, For. Bull. 14(N.S.) :36 (1969).

Polyechma abyssinicum Hochst. ex Nees in DC., Prodr. 11:83 (1847).

Hemigraphis abyssinica (Hochst. ex Nees) C. B. Clarke in F.T.A.

5:58 (1899); Broun & Massey, F.S. :340 (1929); Andr., F.P.S. 3:174 (1956).

H. schweinfurthii (S. Moore) C. B. Clarke in l. c. (1899); Broun & Massey, F.S. :340 (1929); Andr., F.P.S. 3:174 (1956).

DARFUR Jebel Marra, piedmont, 1160 m; aquatic. *Wickens* 1174; *Kassas* 360:2, 360:17 & 360:20 (all KHU & CAI, n.v.).

DISTRIBUTION Ghana to Cameroon eastwards to the Sudan Republic and south through E. Africa to Rhodesia and Botswana. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

576 **Hygrophila auriculata** (Schumach.) Heine in Kew Bull. 16:172 (1962) & in F.W.T.A. ed. 2, 2:395 (1963); Cuf., Enum. :930 (1964); Wickens, For. Bull. 14(N.S.) :36 (1969).

Barleria auriculata Schumach., Beskr. Guin. Pl. :285 (1827).

Asteracantha longifolia (L.) Nees in Wall., Pl. As. Rar. 3:90 (1832); Andr., F.P.S. 3:166 (1956).

Hygrophila spinosa T. Anders. in Thwaites, Enum. Pl. Zeyl. :225 (1860); Burkill in F.T.A. 5:31 (1899); Broun & Massey, F.S. :338 (1929).

DARFUR Jebel Marra, not located; lowland plain, 1020 m; alluvial soils. *Lynes* 585; *Wickens* 1138 & 2735; *Kassas* 320 (KHU & CAI, n.v.).

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in SE. Asia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

577 **Hypoestes forskalei** (Vahl) Solander ex Roemer & Schultes, Syst. Veg. 1:140 (1817); C. B. Clarke in F.T.A. 5:249 (1900); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :349 (1929); Wickens, For. Bull. 14(N.S.) :36 (1969); Quézel, Dossier 5:130 (1969).

Justicia forskalei Vahl, Symb. Bot. 1:2 (1790).

[*J. verticillaris* sensu Vahl (1790) et mult. auct., non L.f. (1781).]

[*Hypoestes verticillaris* sensu Solander ex Roemer & Schultes, l. c. (1817); C. B. Clarke in F.T.A. 5:250 (1900); Broun & Massey, F. S. :349 (1929); Andr., F.P.S. 3:177 (1956); Heine in F.W.T.A. ed. 2, 2:431 (1962); Cuf., Enum. :962 (1964), non L.f. (1781).] [*H. hildebrandtii* sensu Wickens, For. Bull. 14(N.S.) :36 (1969), non Lindau (1894).]

DARFUR Jebel Marra, piedmont and massif, 1160–2700 m; upland grassland, arable lands and waste places. *Lynes* s.n., 2a, 2c & 42; *Rugman* 14; *Macintosh* 67 & 107; *Dandy* 68 & 119 (both BM!); *Aglen* 47; *Jackson* 2587 & 3298; *Pettet* J.180 & J.189; *Wickens* 1041, 1217, 1384, 1408, 2454 & 2701; *Kassas* 155, 190, 446, 516 & 679 (all KHU & CAI, n.v.); *Kamil* 1092 & 1102. Vernacular name: (Fur) *kilmi* or *kolma*.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in the Yemen. Widespread through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

578 **Justicia kotschy** (Hochst.) Dandy ex F. W. Andr., F.P.S. 3:180 (1956); Cuf., Enum. :971 (1964).

Tyloglossa kotschy Hochst. in Flora 26:74 (1843).

Justicia sexangularis T. Anders ex Lindau in Engl. & Prantl, Pflanzenfam. 3,3B:349 (1895); C. B. Clarke in F.T.A. 5:198 (1899); Broun & Massey, F.S. :346 (1929); Wickens, For. Bull. 14(N.S.) :36 (1969), *nom. illegit.*

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; lowland plain, 1100 m; savanna, upland grassland and arable lands. *Lynes* 587; *Wickens* 1049, 2167, 2315, 2633 & 2708; *Kamil* 1093.

DISTRIBUTION Sudan Republic, Ethiopia, Uganda and Kenya. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

Note: The taxonomic limits of this species and allied species such as *J. schimperi* (Hochst.) Dandy ex F. W. Andr. have not yet been fully worked out.

579 **Lepidagathis collina** (Endl.) Milne-Redh. in Kew Bull. 8:119 (1953); Andr., F.P.S. 3:182 (1956); Heine in F.W.T.A. ed. 2, 2:416 (1963); Cuf., Enum. :940 (1964); Wickens, For. Bull. 14(N.S.) :36 & 37 (1969).

Russeggera collina Endl., Iconogr. Gen. Pl., t.94 (1838).

Lepidagathis radicalis Hochst. ex Nees in DC., Prodr. 11:255 (1847); C. B. Clarke in F.T.A. 5:123 (1899); Broun & Massey, F.S. :344 (1929).

L. schweinfurthii Lindau in Engl., Bot. Jahrb. 20:16 (1894); C. B. Clarke in l. c. (1899); Broun & Massey, F.S. :344 (1929); Andr., F.P.S. 3:182 (1956).

L. diversa C. B. Clarke in F.T.A. 5:126 (1899); Andr., F.P.S. 3:183 (1956).

[*L. scariosa* sensu Norman in Journ. Bot. 62:138 (1924), non Nees (1832).]

DARFUR Jebel Marra, piedmont and massif, 1160–2500 m; stony soils. *Lynes* 143 (BM!); *Sandison* 22 & 23 (both BM!); *Jackson* 2629; *Robertson* 113; *Wickens* 1280 & 1736; *Kassas* 380 & 799 (both KHU & CAI, n.v.).

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia. Locally scattered through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

580 **Lepidagathis scariosa** Nees in Wall., Pl. As. Rar. 3:95 (1832); C. B. Clarke in F.T.A. 5:122 (1899); Broun & Massey, F.S. :344 (1929); Andr., F.P.S. 3:182 (1956); Cuf., Enum. :940 (1964).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plains, 1000 m; savanna. *Lynes* 584; *Jackson* 2544.

DISTRIBUTION Central provinces of the Sudan Republic, Ethiopia and south through E. Africa to Rhodesia and SW. Africa; also in Arabia and India.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

581 **Monechma ciliatum** (Jacq.) Milne-Redh. in Bull. Misc. Inf. Kew 1934:304 (1934) & in Kew Bull. 5:381 (1951); Andr., F.P.S. 3:184 (1956); Heine in F.W.T.A. ed. 2, 2:429 (1963); Quézel, Dossier 5:130 (1969).
Justicia ciliata Jacq., Hort. Vind. 2:47, t.104 (1772).
Monechma hispidum Hochst. in Flora 24:375 (1841) & 26:76 (1843); C. B. Clarke in F.T.A. 5:213 (1900); Broun & Massey, F.S. :347 (1929).
 DARFUR Jebel Marra, massif, 1350 m; lowland plain, 1020 m; savanna. *Wickens* 2339 & 2349; *Kassas* 175 (KHU & CAI, *n.v.*).
 DISTRIBUTION Senegal to Cameroon and eastwards to the central and southern provinces of the Sudan and south through E. Africa to Malawi and Zambia.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

582 **Nelsonia canescens** (Lam.) Sprengel, Syst. Veg. 1:42 (1825); Andr., F.P.S. 3:184 (1956); Heine in F.W.T.A. ed. 2, 2:418 (1963); Cuf., Enum. :926 (1964).
Justicia canescens Lam., Tab. Encycl. Méth. Bot. 1:41 (1791).
Nelsonia campestris R. Br., Prodr. :481 (1810); Burkill in F.T.A. 5:28 (1899); Broun & Massey, F.S. :338 (1929).
 DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1000 m; alluvial soils. *Macintosh* 54 & 63; *Jackson* 2525 bis; *Wickens* 1069, 1105 & 1112; *Kassas* 360:1, 394 & 838 (all KHU & CAI, *n.v.*).
 DISTRIBUTION Senegal to Ethiopia southwards to Angola and Mozambique; widespread through the tropics. Widespread through the southern provinces of the Sudan.
 FLORISTIC CATEGORY Pantropical.

583 **Peristrophe bicalyculata** (Retz.) Nees in Wall., Pl. As. Rar. 3:113 (1832); C. B. Clarke in F.T.A. 5:242 (1900); Broun & Massey, F.S. :348 (1929); Andr., F.P.S. 3:185 (1956); Heine in F.W.T.A. ed. 2, 2:424 (1963); Cuf., Enum. :959 (1964); Quézel, Dossier 5:131 (1969).
Dianthera bicalyculata Retz. in Svenska Vetensk. Handl. 36:297 t.9 (1775).
 DARFUR Jebel Marra, massif, 1525 m; lowland plain, 1020 m; wayside and fallow lands. *Pettet* J.185; *Wickens* 2796; *Kassas* 157 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *kussum buroh*.
 DISTRIBUTION Mauritania to Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; also in Arabia and India. Widespread through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

584 **Ruellia patula** Jacq., Misc. Austr. Bot. 2:358 (1781–2); C. B. Clarke in F.T.A. 5:45 (1899); Norman in Journ. Bot. 62:1138 (1924); Broun & Massey, F.S. :339 (1929); Andr., F.P.S. 3:187, fig. 50 (1956); Cuf., Enum. :938 (1964); Quézel, Dossier 5:131 (1969).
 DARFUR Jebel Marra, massif, 1780–1980 m; *Lynes* 142 (BM, *n.v.*); *Macintosh* 125 & 130; *Kassas* 441 & 788 (both KHU & CAI, *n.v.*).
 DISTRIBUTION Chad eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and SW. Africa, also in Madagascar, Arabia and India. Widely distributed through the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian, Madagascan and Deccan Regions.

585 **Ruspolia decurrens** (Hochst. ex Nees) Milne-Redh. in Bull. Misc. Inf. Kew 1936:269 (1936); Andr., F.P.S. 3:187 (1956).
Eranthemum decurrens Hochst. ex Nees in DC., Prodr. 11:453 (1847); C. B. Clarke in F.T.A. 5:170 (1899); Broun & Massey, F.S. :343 (1929).
 DARFUR Jebel Marra, massif, 1350 m; *Kassas* 198 (KHU & CAI!).
 DISTRIBUTION Chad eastwards to Ethiopia, Tanzania, Malawi, Mozambique, Zambia and Rhodesia. Widely scattered through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

Verbenaceae

586 **Clerodendrum umbellatum** Poir., Encycl. Méth. Bot. 5:166 (1804); Huber in F.W.T.A. ed. 2, 2:442 (1963).
Volkameria cordifolia Hochst. ex Schauer in DC., Prodr. 11:657 (1847), **synon. nov.**
Clerodendrum cordifolium (Hochst. ex Schauer) A. Rich., Tent. Fl. Abyss. 2:170 (1851); Baker in F.T.A. 5:304 (1900); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :353 (1929); Andr., F.P.S. 3:195 (1956); Cuf., Enum. :798 (1962), **synon. nov.**
 DARFUR Jebel Marra, piedmont and massif, 1160–1830 m; lowland plain, 1020 m; savanna and fallow lands. *Lynes* 1 & 568; *Wickens* 1157, 1338, 1552 & 1861. Vernacular name: (Fur) *meril meril* or *mirrl mirrl*.
 DISTRIBUTION Senegal to Gabon eastwards to Ethiopia and south into Uganda, Kenya and Tanzania. Widely distributed through the southern provinces of the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

587 **Lantana camara** L., Sp. Pl. :627 (1753); Stapf in F.T.A. 5:275 (1900); Meikle in F.W.T.A. ed. 2, 2:435 (1963); Wickens, For. Bull. 14(N.S.) :37 (1969).
 DARFUR Lowland plain, 1020 m; hedgerows. *Wickens* 1335.
 DISTRIBUTION Cultivated throughout the tropics and often occurring as an escape from cultivation.
 FLORISTIC CATEGORY Pantropical cultigen.

588 **Lantana rhodesiensis** Moldenke in Phytologia 3:269 (1950); Andr., F.P.S. 3:196 (1956); Meikle in F.W.T.A. ed. 2, 2:435 (1963).
L. salvifolia sensu Stapf in F.T.A. 5:276 (1900); Broun & Massey, F.S. :350 (1929), pro parte, *non* Jacq. (1803).
 DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1866 & 1898.
 DISTRIBUTION Port. Guinea to Cameroon and eastwards to the southern provinces of the Sudan Republic, south through East Africa to Mozambique and Rhodesia.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

589 **Lippia multiflora** Moldenke in Phytologia 3:168 (1949); Andr. F.P.S. 3:197 (1956); Meikle in F.W.T.A. ed. 2, 2:437, fig. 306 (1963).
L. adoënsis sensu Baker in F.T.A. 5:280 (1900); Broun & Massey, F.S. :350 (1929), pro parte, *non* Hochst. (1841).
 DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; savanna and arable lands. *Jackson* 3304; *Robertson* 6; *Pettet* J.181; *Wickens* 1042 & 2630; *Kassas* 128, 129 & 177 (all KHU & CAI!); *Kamil* 1180. Vernacular name: (Fur) *biringil* or *nasu*; (Arabic) *danab el agrab*.
 DISTRIBUTION Guinée Republic to Angola and eastwards to the southern provinces of the Sudan Republic and Uganda (Map 151).
 FLORISTIC CATEGORY Guineo-Congo Region and Sudanian Domain.

590 **Verbena officinalis** L., Sp. Pl. :20 (1753); Baker in F.T.A. 5:286 (1900); Broun & Massey, F.S. :351 (1929); Andr., F.P.S. 3:199 (1956); Cuf., Enum. :787 (1962).
 DARFUR Jebel Marra, piedmont and massif, 1160–2050 m; arable lands. *Dandy* 139 & 164 (both BM!); *Wickens* 1893 & 3000.
 DISTRIBUTION Niger eastwards to the Somali Republic and south through E. Africa to the Cape; also North Africa, Europe, Asia, Australia and the Americas. Widely distributed through the central provinces of the Sudan *fide* Andr., but no further specimens seen.
 FLORISTIC CATEGORY Subcosmopolitan.

591 **Vitex doniana** Sweet, Hort. Brit. ed. 1, :323 (1827); Baker in F.T.A. 5:323 (1900); Andr., F.P.S. 3:200, fig. 52 (1956); Cuf., Enum. :797 (1962); Huber in F.W.T.A. ed. 2, 2:446, fig. 308 (1963).

V. cienkowskii Kotschy & Peyr., Pl. Tinn. :27, t.12 (1867); Baker in F.T.A. 5:328 (1900); Broun & Massey, F.S. :352 (1929).

DARFUR Jebel Marra, massif, 1830 m; *Kamil* 1197.

DISTRIBUTION Senegal eastwards to Ethiopia and south to Angola, Rhodesia and Mozambique, also in the Mascarenes (Map 152). Widespread through the southern provinces of the Sudan and also in the Nuba Mountains (Jebel Ed Dair).

FLORISTIC CATEGORY Guineo-Congo and Sudano-Zambeian Regions.

Labiatae

592 **Basilicum polystachyon** (L.) Moench, Suppl. Méth. Pl. :143 (1802); Andr., F.P.S. 3:205 (1956); Cuf., Enum. :844 (1963); Morton in F.W.T.A. ed. 2, 2:454 (1963).

Ocimum polystachyon L., Mant. 2:567 (1771).

Moschosma polystachyon (L.) Benth. in Wall. Pl. As. Rar. 2:13 (1831); Baker in F.T.A. 5:353 (1900); Broun & Massey, F.S. :356 (1929).

DARFUR Lowland plain, 600 m; marshy stream bank. *Wickens* 1634.

Vernacular name: (Arabic) *kormano*.

DISTRIBUTION Ivory Coast to Cameroon and eastwards to the Somali Republic, south through E. Africa to Mozambique, Transvaal and Angola; widespread in the Old World tropics. Widespread in the southern provinces of the Sudan and in the Nile valley.

FLORISTIC CATEGORY Palaeotropical.

593 **Becium obovatum** (E. Meyer) N. E. Brown in Fl. Cap. 5(1):230 (1910); Broun & Massey, F.S. :357 (1929); Andr., F.P.S. 3:206 (1956); Cuf., Enum. :850 (1963); Morton in F.W.T.A. ed. 2, 2:453 (1963).

Ocimum obovatum E. Meyer, Comm. Pl. Austr. :226 (1837).

[*O. knyanum* sensu Baker in F.T.A. 5:346 (1900), *non* Vatke (1871).]

O. knyanum Vatke var. *astephanum* Baker in F.T.A. 5:346 (1900).

DARFUR Lowland plain, 1280 m; savanna. *Wickens* 1964.

DISTRIBUTION Guinée Republic to the Cameroon and eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa. In the southern provinces of the Sudan *vide* Andr., but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambeian Region.

594 **Haumaniastrum caeruleum** (Oliver) DuRoi. & Plancke in Biol. Jaarg. 27:225 (1959); Morton in Journ. Linn. Soc. Bot. 58:267 (1962) & F.W.T.A. ed. 2, 2:456 (1963); Wickens, For. Bull. 14(N.S.):37 (1969).

Acrocephalus caeruleus Oliver in Trans. Linn. Soc. 19:135, t.133 (1875); Baker in F.T.A. 5:359 (1900).

A. schweinfurthii Briq. in Engler, Bot. Jahrb. 19:171 (1894);

Broun & Massey, F.S. :356 (1929); Andr., F.P.S. 3:204 (1956).

A. heudelotii Briq. in Bull. Herb. Boiss. 2:689 (1894); Baker in

F.T.A. 5:361 (1900); Broun & Massey, F.S. :356 (1929).

A. lagoënsis Baker in Bull. Misc. Inf. Kew 1895:152 (1895) & in F.T.A. 5:360 (1900).

DARFUR Jebel Marra, piedmont and massif, 1160–1765 m; savanna. *Robertson* 20; *Pettet* 191, 192 & 193; *Wickens* 982 & 2806; *Kassas* 259 & 293 :16 (both KHU & CAI!).

DISTRIBUTION Mali to Cameroon and eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Zambia and Angola.

FLORISTIC CATEGORY Sudano-Zambeian Region.

395 **Haumaniastrum galeopsifolium** (Baker) DuRoi. & Plancke in Biol. Jaarg. 27:225 (1959); Morton in F.W.T.A. ed. 2, 2:455 (1963); Wickens, For. Bull. 14(N.S.):37 (1969).

Acrocephalus galeopsifolium Baker in F.T.A. 5:356 (1900); Andr., F.P.S. 3:240 (1956).

DARFUR Jebel Marra, massif, 1375 m; moist places. *Wickens* 2515B.

DISTRIBUTION Guinée Republic to Cameroon eastwards to the Sudan Republic (Jebel Marra and Imatongs) and south through Uganda and Tanzania to Malawi and Rhodesia.

FLORISTIC CATEGORY Sudano-Zambeian Region.

596 **Hoslundia opposita** Vahl, Enum. Pl. 1:212 (1805); Baker in F.T.A. 5:377 (1900), incl. var. *verticillata* (Vahl) Baker; Broun & Massey, F.S. :357 (1929); Andr., F.P.S. 3:210 (1956); Cuf., Enum. :841 (1963); Morton in F.W.T.A. ed. 2, 2:456 (1963).

DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1100–1280 m; savanna, gallery forest and old fallow lands. *Lynes* 589; *Wickens* 1860, 1943 & 1966.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; also in Madagascar. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian and Madagascan Regions.

597 **Hyptis pectinata** (L.) Poit. in Ann. Mus. Paris 7:474, t.30 (1806); Baker in F.T.A. 5:448 (1900); Broun & Massey, F.S. :360 (1929); Andr., F.P.S. 3:210 (1956); Cuf., Enum. :826 (1962); Morton in F.W.T.A. ed. 2, 2:466 (1963).

Nepeta pectinata L., Syst. ed. 10 :1096 (1759).

DARFUR Jebel Marra, piedmont and massif, 1160–1830 m; stream banks. *Dandy* 32 (BM!); *Wickens* 1188 & 2970; *Kassas* 251 & 344 (both KHU & CAI, *n.v.*).

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal; a weed, native of tropical America, now widespread through the tropics. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical weed.

598 **Lavandula pubescens** Decne. in Ann. Sci. Nat. II, 2:246 (1834); Baker in F.T.A. 5:450 (1900); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :360 (1929); Chayter in Journ. Linn. Soc. Bot. 51:189 (1937); Andr., F.P.S. 3:212 (1956); Quézel, Dossier 5:132 (1969).

[*L. coronopifolia* sensu Lester-Garland in Journ. Bot. 59:48 (1921); Broun & Massey, F.S. :360 (1929) pro specim. Jebel Marra, *non* Poir. (1813).]

[*L. stricta* sensu Wickens, For. Bull. 14(N.S.):38 (1969), *non* Delile (1813).]

DARFUR Jebel Marra, massif, 1900–2750 m; upland grassland.

Lynes s.n. & 151; *Rugman* 9; *Macintosh* 40; *Sandison* 21 (BM!); *Dandy* 97 (BM, *n.v.*); *Jackson* 2586; *Robertson* 138; *Wickens* 1224 & 2394; *Kassas* 456, 461:7, 464:5, 489 & 695 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *mirma*; (Arabic) *sha'dluk*.

DISTRIBUTION Sudan Republic (Jebel Marra and its northern outlier, Jebel Gurgeil), Egypt, Sinai and north to Syria (Map 153). FLORISTIC CATEGORY Eastern Mediterranean Subregion.

Note: The specimen *Lynes* 403a from Jebel Meidob, which lies to the NW. of Jebel Marra, has been referred to by Chayter *l.c.* :191 as *L. coronopifolia* Poir. (syn. *L. stricta* Delile; Broun & Massey *l.c.* :360 and Andrews *l.c.* :212). This should be referred to *L. antineae* Maire, a species found in the Sahara mountains of Ahaggar, Tassili, Air and Tibesti.

According to Shaw in Bull. Misc. Inf. Kew 1934:288 (1934)

L. coronopifolia occurs on Jebel Uweinat. The specimen, *Shaw* 15 appears to be no longer extant, but *Léonard* 4921 (BR!) from the same locality resembles the Jebel Meidob specimen.

599 **Leonotis nepetifolia** (L.) Aiton f. in Aiton, Hort. Kew. ed. 2, 3:409 (1811); Cuf., Enum. :808 (1962).

Phlomis nepetifolia L., Sp. Pl. :586 (1753).

var. **africana** (P. Beauv.) J. K. Morton in Journ. Linn. Soc. Bot.

58:275 (1962) & in F.W.T.A. ed. 2, 2:470, fig. 313 (1963);

Wickens, For. Bull. 14(N.S.):38 (1969).

Phlomis africana P. Beauv., Fl. Owari 2:82, t.111 (1819).

Leonotis pallida (Schum. & Thonn.) Benth. in DC., Prodr. 12:535 (1834); Baker in F.T.A. 5:491 (1900); Broun & Massey, F.S. :363 (1929).

L. africana (P. Beauv.) Briq. in Engl. & Prantl, Pflanzenfam. 4,3A:246 (1896); Andr., F.P.S. 3:212 (1956); Cuf., Enum. :807 (1962).

DARFUR Jebel Marra, piedmont, 1160 m; river bank. *Wickens* 1812.

DISTRIBUTION Senegal eastwards to Ethiopia and south to SW.

Africa and the Transvaal. Widespread through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region; species

Pantropical.

600 *Leucas martinicensis* (Jacq.) Aiton f. in Aiton, Hort. Kew. ed. 2, 3:409 (1811); Baker in F.T.A. 5:479 (1900); Broun & Massey, F.S. :362 (1929); Andr., F.P.S. 3:215 (1956); Cuf., Enum. :810 (1962); Morton in F.W.T.A. ed. 2, 2:470 (1963); Quézel, Dossier 5:132 (1969).

Clinopodium martinicense Jacq., Enum. Pl. Carib. :25 (1760).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m;

lowland plain, 1020 m; savanna and arable lands. *Lynes* 592;

Wickens 1040, 1331, 1765, 2206 & 2566; *Kassas* 180 & 237 (both KHU & CAI!) & 682 (KHU & CAI, n.v.). Vernacular name:

(Fur) *merrisat tuerat*; (Arabic) *abu ajjura*.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; widespread through the tropics. Widespread through the Sudan.

FLORISTIC CATEGORY Pantropical weed.

601 *Mentha longifolia* (L.) Hudson, Fl. Angl. :221 (1762); Cuf., Enum. :825 (1962).

M. spicata L. var. *longifolia* L., Sp. Pl. :576 (1753).

M. sylvestris L., Sp. Pl. ed. 2, :804 (1762); Baker in F.T.A. 5:451 (1900); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :360 (1929); Wickens, For. Bull. 14(N.S.):38 (1969).

M. longifolia (L.) Hudson subsp. *schimperi* (Briq.) Briq. in Engl. & Prantl, Pflanzenfam. 4,3A:321 (1897); Andr., F.P.S. 3:217 (1956); Wickens, For. Bull. 14(N.S.):38 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; lowland plain, 1020 m; marshy places. *Lynes* s.n. & 27 (both BM!) & 591; *Macintosh* 27; *Dandy* 75 & 143 (both BM!); *Aglen* 48;

Jackson 2546; *Robertson* 112; *Wickens* 1012 & 2275; *Kassas* 321, 363, 425, 461:33, 529 & 821 (all KHU & CAI, n.v.). Vernacular

name: (Fur) *dordid* or *nanna*; (Arabic) *rehan* or *ab rihan*. Leaves used to relieve the pain of toothache.

DISTRIBUTION Sudan Republic (Darfur), Ethiopia, upland Kenya and Tanzania, Rhodesia, Morocco across to Egypt, Europe, Arabia, central Asia and the Himalayas (Map 154).

FLORISTIC CATEGORY Palaearctic.

602 *Nepeta ballotifolia* Hochst. ex A. Rich., Tent. Fl. Abyss.

2:196 (1850); Baker in F.T.A. 5:461 (1900); Norman in Journ.

Bot. 62:138 (1924); Broun & Massey, F.S. :361 (1929); Andr., F.P.S. 3:217 (1956); Cuf., Enum. :807 (1962).

DARFUR Jebel Marra, massif, 2200–3000 m; upland grassland, in shady sites. *Lynes* 152a & 153; *Macintosh* 13; *Sandison* 18, 19 & 20

(all BM!); *Dandy* 111 (BM!); *Jackson* 2649; 3331 & 3382 *Robertson* 123; *Wickens* 1266 & 1714; *Kassas* 520 & 878 (both KHU & CAI, n.v.).

DISTRIBUTION Uplands of Sudan Republic (Jebel Marra) and Ethiopia (Map 155).

FLORISTIC CATEGORY Ethiopian-montane.

Note: The Jebel Marra specimens are remarkably uniform and compare favourably with the holotype, *Schimper* 720 (G!). No Ethiopian material has been seen apart from the type specimen.

Schimper 5 (K) cited by Baker, *l. c.* (1900) does not belong here.

603 *Ocimum hadiensae* Forsk., Fl. Aegypt.-Arab. :109 (1775); Andr., F.P.S. 3:218, 1:58 (1956); Cuf., Enum. :846 (1963);

Quézel, Dossier 5:132 (1969).

O. menthaefolium Hochst. ex Benth. in DC., Prodr. 12:34 (1848);

Baker in F.T.A. 5:340 (1900); Broun & Massey, F.S. :355 (1929).

DARFUR Jebel Marra, foothills and massif, 1130–1680 m; lowland plain, 1000–1100 m; savanna and arable lands. *Lynes* 347, 504 & 590; *Macintosh* 108, 109 & 146; *Wickens* 1148, 2065, 2239 & 2703. Vernacular name: (Arabic) *rehan*.

DISTRIBUTION Chad eastwards to the Somali Republic, Kenya and Tanzania; also in Socotra and Arabia. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sudanian, Afrioriental and South Arabian Domains.

604 *Ocimum suave* Willd., Enum. Hort. Berol. :629 (1809); Baker in F.T.A. 5:338 (1900); Broun & Massey, F.S. :355 (1929); Andr., F.P.S. 3:218 (1956); Morton in F.W.T.A. ed. 2, 2:451 (1963).

DARFUR Jebel Marra, massif, 1350 m. *Kassas* 130, 231, 360:21, 753 & 845 (all KHU & CAI!).

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal; also in tropical Asia. In the Sudan it also occurs in the southern provinces.

FLORISTIC CATEGORY Palaeotropical.

605 *Otostegia fruticosa* (Forsk.) Schweinf. ex Penzig, Atti Congr. Bot. Genova :356 (1893); Andr., F.P.S. 3:221, fig. 59 (1956); Quézel, Dossier 5:132 (1969); Sebald in Stuttgarter Beitr. Naturk., Ser. A, No. 263:58 (1973).

Clinopodium fruticosum Forsk., Fl. Aegypt.-Arab. :107 (1775).

Otostegia repanda Benth., Lab. Gen. & Sp. :602 (1834); Baker in F.T.A. 5:495 (1900); Broun & Massey, F.S. :362 (1929); Cuf., Enum. :815 (1962); Wickens, For. Bull. 14(N.S.):38 (1969).

O. scariosa Benth., Lab. Gen. & Sp. :602 (1834); Baker in *l. c.* (1900); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :362 (1929).

subsp. *fruticosa*; Sebald in *l. c.* :61 fig. 17, 30, 31 (1973).

DARFUR Jebel Marra, piedmont and massif, 1150–2450 m; rocky places. *Lynes* s.n. (BM!), 88a & 88b (BM!); *Dandy* 70 (BM!); *Jackson* 2592; *Robertson* 124; *Wickens* 1016, 1077 & 1078; *Kassas*

230, 345, 413, 521, 560 & 772 (all KHU & CAI, n.v.); *Kamil* 1191. DISTRIBUTION Cameroon, Sudan Republic (Jebel Marra and Red Sea Hills) and Ethiopia; also in Egypt (Jebel Elba), and the Yemen (Map 156).

FLORISTIC CATEGORY Afro-montane.

606 *Plectranthus caninus* Roth, Nov. Pl. Sp. :279 (1821).

Coleus spicatus Benth. in Wall., Pl. As. Rar. 2:15 (1831).

C. caninus (Roth) Vatke in Linnaea 37:318 (1871), pro parte, excl. specim. cit.; Codd in Bothalia 7:433 (1961).

DARFUR Jebel Marra, massif, 1780–1900 m; lowland plain; 1050 m; shaded sites. *Wickens* 2622, & 2766; *Kassas* 844 (KHU & CAI!).

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and Somali Republic south through E. Africa to Rhodesia, Angola, and SW. Africa; also in India.

FLORISTIC CATEGORY Afrioriental and Zambezian Domains and Deccan Region.

607 *Plectranthus jebel-marrae* Wickens & Mathew in Kew Bull. 25:255, fig. 1 & 2a (1971).

[*P. glandulosus* sensu Quézel, Dossier 5:132 (1969), non Hook.f. (1861).]

DARFUR Jebel Marra, piedmont and massif, 1160–1400 m;

lowland plain, 1100 m; moist shady places. *Lynes* 589 (BM, holotype!); *Wickens* 2183; 2188, 2324 & 2519. Also recorded from Jebel Gurgeil.

DISTRIBUTION Sudan Republic (Darfur).

FLORISTIC CATEGORY Endemic.

608 *Satureja punctata* (Benth.) Briq. in Engl. & Prantl, Pflanzenfam. 4,3A:299 (1896); Cuf., Enum. :823 (1962); Morton in F.W.T.A. ed. 2, 2:467 (1963); Wickens, For. Bull. 14(N.S.):38 (1969).

Micromeria punctata Benth., Lab. Gen. Sp. :378 (1834).

[*M. biflora* sensu Baker in F.T.A. 5:452 (1900); Lester-Garland in Journ. Bot. 59:48 (1921); Norman in Journ. Bot. 62:138 (1924); Broun & Massey, F.S. :361 (1929); Andr., F.P.S. 3:217 (1956); Quézel, Dossier 5:132 (1969), *non* (Buch.-Ham. ex D. Don) Benth. (1848).]

DARFUR Jebel Marra, piedmont and massif, 1160–3000 m; stream banks and upland grassland. *Lynes* 144a & b, 146a, b, c, d & e (all BM!); s.n., 51, 54c, 145 & 148; *Macintosh* 42; *Dandy* 87, 102, 116, 127 & 236 (all BM!); *Drar* s.n.; *Aglen* 43 & 64; *Jackson* 2591, 2648 & 3339; *Robertson* 126 & 151; *Wickens* 1080, 1213, 1221, 1680, 1706, 1809, 2406, 2412, 2662, & 2668; *Kassas* 293:2, 335, 405, 434, 464:3, 470, 500, 559, 606, 638 & 679 (all KHU & CAI, *n.v.*). DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra, the Red Sea Hills, Imatongs and Didinga Mts.), Ethiopia, Somali Republic and south through E. Africa to the Cape (Map 157).

FLORISTIC CATEGORY Afro-montane.

609 ***Solenostemon latifolius*** (*Hochst. ex Benth.*) *J. K. Morton* in Journ. Linn. Soc. Bot. 58:271, fig. 8 (1962) & in F.W.T.A. ed. 2, 2:463 (1963); Cuf., Enum. :841 (1963); Wickens, For. Bull. 14(N.S.) :37 (1969).

Coleus latifolius Hochst. ex Benth. in DC., Prodr. 12:74 (1848); Baker in F.T.A. 5:347 (1900); Broun & Massey, F.S. :358 (1929); Andr., F.P.S. 3:209 (1956).

Plectranthus bongensis Baker in F.T.A. 5:410 (1900); Broun & Massey, F.S. :358 (1929).

Coleus darforensis R. Good. in Journ. Bot. 62:138 (1924); Andr., F.P.S. 3:209 (1956) **synon. nov.**

[*C. dissitiflorus* sensu Norman in Journ. Bot. 62:138 (1924), *non* Gürke (1894).]

[*C. autrani* sensu Wickens, For. Bull. 14(N.S.) :37 (1969), *non* Briq. (1894).]

Solenostemon darforensis (R. Good) Mathew in Kew Bull. 25:258 (1971), **synon. nov.**

DARFUR Jebel Marra, piedmont and massif, 1160–2500 m; stream banks. *Lynes* 4a & b, 4c (BM, holotype of *C. darforensis*!) & 61 (BM!); *Macintosh* 110; *Dandy* 129 & 159 (both BM!); *Jackson* 3303; *Robertson* 146; *Wickens* 994, 1187 & 2614; *Kassas* 293:3 & 661 (both KHU & CAI, *n.v.*); *Kamil* 1088.

DISTRIBUTION Mali to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique and Angola. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Note: This is a variable species requiring further taxonomic investigation.

610 ***Solenostemon monostachyus*** (*P. Beauv.*) *Briq.* in Engl. & Prantl, Pflanzenfam. 5.3A:359 (1897); Morton in F.W.T.A. ed. 2, 2:464, fig. 312 (1963).

Ocimum ? *monostachyum* P. Beauv., Fl. Oware 2:60, t.95, fig. 1 (1818).

subsp. ***perennis*** *J. K. Morton* in Journ. Linn. Soc. Bot. 58:272 (1962) & in F.W.T.A. ed. 2, 2:465 (1963).

DARFUR Jebel Marra, piedmont, 1160 m; stream banks. *Wickens* 2128.

DISTRIBUTION Ivory Coast to Nigeria eastwards to the southern provinces of the Sudan Republic.

FLORISTIC CATEGORY Sudanian Domain.

Hydrocharitaceae

611 ***Ottelia ulvifolia*** (*Planchon*) *Walp.*, Ann. 3:510 (1853); Broun & Massey, F.S. :372 (1929); Andr., F.P.S. 3:227, fig. 60 (1956); Hepper, F.W.T.A. ed. 2, 3:7, fig. :316 (1968).

Damasonium ulvifolium Planchon in Ann. Sci. Nat. III, 11:81 (1849).

Ottelia lancifolia A. Rich., Tent. Fl. Abyss. 2:280 (1851); Wright in F.T.A. 7:7 (1897); Norman in Journ. Bot. 62:135 (1924);

Broun & Massey, F.S. :372 (1929).

Bootia abyssinica Ridley in Journ. Linn. Soc. Bot. 22:239 (1886);

Broun & Massey, F.S. :372 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–1500 m; aquatic. *Lynes* 76; *Wickens* 998 & 2960; *Kassas* 312 (KHU & CAI, *n.v.*); *Kamil* 1171.

DISTRIBUTION Gambia to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Madagascar. Widely distributed along the Nile and its tributaries in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

Alismataceae

612 ***Limnophyton obtusifolium*** (*L.*) *Miq.*, Fl. Ind. Bat. 3:242 (1855); Wright in F.T.A. 8:209 (1901); Broun & Massey, F.S. :365 (1929); Andr., F.P.S. 3:230, fig. 61 (1956); Carter, F.T.E.A. Alismat. :9, fig. 5/1–5 (1960); Hepper, F.W.T.A. ed. 2, 3:11, fig. 318/1–5 (1968).

Sagittaria obtusifolia L., Sp. Pl. :993 (1753).

Alisma kotschyi Hochst. ex A. Braun in Flora 26:499 (1843).

DARFUR Lowland plain, 1020 m; aquatic. *Lynes* 621 (BM!);

Wickens 1145 & 2496.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal; also in Madagascar, India, Ceylon and the Malay Islands. Throughout the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

Potamogetonaceae

613 ***Potamogeton nodosus*** *Poir.* in Lam., Encycl. Méth. Suppl. 4:535 (1816); Andr., F.P.S. 3:234 (1956); Cuf., Enum. :1197 (1968).

P. richardii Solms-Laub. in Schweinf., Beitr. Fl. Aethiop. :194 & 292 (1867); Bennett in F.T.A. 8:219 (1901); Wickens, For. Bull. 14(N.S.) :39 (1969).

DARFUR Jebel Marra, piedmont and massif, 1160–2600 m; aquatic. *Jackson* 3285; *Wickens* 1020, 2680 & 2914; *Abdel Gadir* & *Pellet* in *Kassas* 728 (KHU & CAI!).

DISTRIBUTION: Chad eastwards to Ethiopia and south through E. Africa to the Cape; also in central and southern Europe, North Africa, Middle East and America. Widely distributed through the central provinces of the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

614 ***Potamogeton pusillus*** *L.*, Sp. Pl. :217 (1753); Bennett in F.T.A. 8:222 (1901); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :367 (1929); Andr., F.P.S. 3:235 (1956); Cuf., Enum. :1198 (1968).

DARFUR Jebel Marra, piedmont and massif, 1160–2400 m; aquatic. *Lynes* 7 (BM!); *Jackson* 2610 & 3284; *Wickens* 1005, 1413, 2629, 2915 & 2982; *Kassas* 375, 461:14, 598 & 855 (all KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and Somali Republic south through E. Africa to Rhodesia and Angola; also in North Africa, Europe, Asia, America and Australia.

FLORISTIC CATEGORY Subcosmopolitan.

615 ***Potamogeton schweinfurthii*** *A. Bennett* in F.T.A. 8:220 (1901); Dandy in Journ. Linn. Soc. Bot. 50:526, fig. 6 (1937); Andr., F.P.S. 3:234 (1956); Hepper, F.W.T.A. ed. 2, 3:16 (1968). [*P. lucens* sensu Broun & Massey, F.S. :367 (1929), *non* L. (1753).] DARFUR Jebel Marra, piedmont, 1160 m; aquatic. *Wickens* 1554 & 2916; *Kassas* 374 (KHU & CAI!).

DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic and southwards through E. Africa to Natal and SW. Africa; also in Egypt and Tunisia. In the Sudan it is found in the southern provinces. (Map—Dandy *l. c.*, fig. 6).

FLORISTIC CATEGORY Sudano-Zambezian Region.

Najadaceae

616 **Najas graminea** *Del.*, Fl. Egypte 2:282, fig. 3 (1815); Bennett in F.T.A. 8:226 (1901); Broun & Massey, F.S. :367 (1929); Andr., F.P.S. 3:237 (1956).
DARFUR Lowland plain, 1020 m; aquatic. *Wickens* 2497.
DISTRIBUTION Southern provinces of the Sudan Republic, Ethiopia, Kenya; also in Egypt, southern Europe, Asia and Australia.
FLORISTIC CATEGORY Palaeotropical.

Commelinaceae

617 **Aneilema lanceolatum** *Benth.* in Hook., Fl. Nigrit. :546 (1849); Brenan in Kew Bull. 6:202 (1952); Andr., F.P.S. 3:239 (1956); Brenan in F.W.T.A. ed. 2, 3:31 (1968); Quézel, Dossier 5:132 (1969).
subsp. **lanceolatum**; J. K. Morton in Journ. Linn. Soc. Bot. 59:453, fig. 8 (1966); Brenan in F.W.T.A. ed. 2, 3:31 (1968).
A. lanceolatum *Benth.* var. *evolutius* C. B. Clarke in DC., Monogr. Phan. 3:227 (1881); Andr., F.P.S. 3:239 (1956), pro parte.
A. schweinfurthii C. B. Clarke in *op. cit.* :228 (1881) & in F.T.A. 8:71 (1901); Broun & Massey, F.S. :389 (1929).
A. soudanicum C. B. Clarke in F.T.A. 8:72 (1901).
DARFUR Jebel Marra, massif, 1375–1780 m. *Macintosh* 124; *Aglen* 45.
DISTRIBUTION Mali to Cameroon eastwards to the southern provinces and the Nuba Mountains in the Sudan Republic, Uganda and Kenya.
FLORISTIC CATEGORY Sudanian and Afrioriental Domains.

618 **Commelina benghalensis** *L.*, Sp. Pl. :41 (1753); C. B. Clarke in DC., Monogr. Phan. 3:159 (1881) & in F.T.A. 8:41 (1901); Broun & Massey, F.S. :387 (1929); Andr., F.P.S. 3:241 (1956); J. K. Morton in Journ. Linn. Soc. Bot. 55:519 (1956) & 60:176 (1967); Brenan in F.W.T.A. ed. 2, 3:48 (1968); Cuf., Enum. :1510 (1971).
var. **benghalensis**; Brenan in F.W.T.A. ed. 2, 3:48 (1968), Cuf., Enum. :1510 (1971).
DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1764 & 2732.
DISTRIBUTION Gambia to Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; also in tropical Asia and Australia. Widely distributed through the Sudan.
FLORISTIC CATEGORY Palaeotropical weed.

619 **Commelina bracteosa** *Hassk.* in Flora 46:385 (1863); C. B. Clarke in DC., Monogr. Phan. 3:180 (1881) & in F.T.A. 8:55 (1901); Broun & Massey, F.S. :388 (1929); Andr., F.P.S. 3:245 (1956); Brenan in F.W.T.A. ed. 2, 3:48 (1968).
C. bainesii C. B. Clarke in *op. cit.* :184 (1881) & in F.T.A. 8:57 (1901).
C. aethiopica C. B. Clarke in *op. cit.* :189 (1881) & in F.T.A. 8:59 (1901); Broun & Massey, F.S. :388 (1929); Andr., F.P.S. 3:245 (1956), **synon. nov.**
[*C. nudiflora* sensu Broun & Massey, F.S. :387 (1929), pro parte, *non* L. (1753).]
DARFUR Jebel Marra, foothills, 1250 m; lowland plain, 1020 m; savanna. *Lynes* 619b; *Aglen* 24; *Wickens* 2001.
DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces and the Nuba Mountains in the Sudan Republic and south through East Africa to Malawi, Mozambique and SW. Africa.
FLORISTIC CATEGORY Sudano-Zambezian Region.

620 **Commelina diffusa** *Burm.f.*, Fl. Ind. :18, t.7, fig. 2 (1768); Andr., F.P.S. 3:241 (1956); J. K. Morton in Journ. Linn. Soc. Bot. 55:521, fig. 18 (1956) & 60:181 (1967); Brenan in F.W.T.A. ed. 2, 3:47 (1968); Cuf., Enum. :1511 (1971).

C. nudiflora *L.*, Sp. Pl. :41 (1753) pro parte; C. B. Clarke in F.T.A. 8:36 (1901); Broun & Massey, F.S. :387 (1929).
subsp. **diffusa**; J. K. Morton in Journ. Linn. Soc. Bot. 60:181, fig. 3 (1967); Brenan in F.W.T.A. ed. 2, 3:47, fig. 332 (1968).
DARFUR Lowland plain, 1020 m; arable weed. *Wickens* 1998.
DISTRIBUTION Senegal to Cameroon and Gabon eastwards to Ethiopia and south through E. Africa to Natal; widespread through the tropics. In the Sudan it is found in the southern provinces.
FLORISTIC CATEGORY Pantropical.

621 **Commelina imberbis** *Ehrentb. ex Hassk.* in Schweinf., Beitr. Fl. Aethiop. :209 (1867); C. B. Clarke in F.T.A. 8:49 (1901); Broun & Massey, F.S. :388 (1929); Andr., F.P.S. 3:245 (1956); J. K. Morton in Journ. Linn. Soc. Bot. 60:185 (1967); Brenan in F.W.T.A. ed. 2, 3:48 (1968); Cuf., Enum. :1513 (1971).
DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; marshy ground and fallow lands. *Wickens* 1664 & 1873; *Kassas* 199 (KHU & CAI, *n.v.*).
DISTRIBUTION Sudan Republic and Ethiopia and southwards through Kenya and Tanzania to Rhodesia, with one record from S. Nigeria. Widely distributed through the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

622 **Commelina kotschyi** *Hassk.* in Schweinf., Beitr. Fl. Aethiop. :207 (1867); C. B. Clarke in F.T.A. 8:49 (1901); Broun & Massey, F.S. :388 (1929); Andr., F.P.S. 3:244, fig. 66 (1956); Quézel, Dossier 5:132 (1969); Cuf., Enum. :1513 (1971).
DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; moist sites. *Macintosh* 136; *Wickens* 1094 & 1351. Vernacular name: (Fur) *algija*; (Arabic) *bayad*.
DISTRIBUTION Sudan Republic, endemic to the northern and central provinces.
FLORISTIC CATEGORY Sahelian Domain, endemic to the Sudan, doubtfully distinct from *C. imberbis*.

623 **Commelina subulata** *Roth*, Nov. Pl. Sp. :23 (1821); C. B. Clarke in F.T.A. 8:38 (1901); Broun & Massey, F.S. :387 (1929); Andr., F.P.S. 3:241 (1956); J. K. Morton in Journ. Linn. Soc. Bot. 60:189 (1967); Brenan in F.W.T.A. ed. 2, 3:47 (1968); Quézel, Dossier 5:132 (1969); Cuf., Enum. :1515 (1971).
DARFUR Jebel Marra, piedmont and massif, 1160–1525 m; gallery forest and marshy ground. *Wickens* 2155 & 2173.
DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in SW. India. No further specimens seen for the Sudan although in the northern and central provinces *fide* Andrews *l. c.*
FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

624 **Cyanotis barbata** *D. Don*, Prodr. Fl. Nepal. :46 (1825); J. K. Morton in Journ. Linn. Soc. Bot. 60:198 (1967); Brenan in F.W.T.A. ed. 2, 3:38 (1968); Wickens, For. Bull. 14(N.S.) :29 (1969); Cuf., Enum. :1520 (1971).
C. hirsuta Fischer & Meyer, Ind. Hort. Sem. Petrop. 8:57 (1842), *nom. subnud.*; C. B. Clarke in F.T.A. 8:78 (1901); Broun & Massey, F.S. :390 (1929); Andr., F.P.S. 3:247, fig. 67 (1956).
C. parasitica Hochst. ex Hassk., Commel. Ind. :116 (1870); C. B. Clarke in F.T.A. 8:79 (1901).
C. mannii C. B. Clarke in DC., Monogr. Afr. Phan. 3:258 (1881) & in F.T.A. 8:83 (1901).
DARFUR Jebel Marra, massif, 1900–2750 m; upland grassland. *Wickens* 2138, 2362, 2414 & 2653. Vernacular name: (Fur) *nimit*.
DISTRIBUTION Uplands of Ghana, Cameroon, Sudan Republic (Jebel Marra, Red Sea Hills and Imatongs), Ethiopia and south through E. Africa to Malawi and Rhodesia (Map 158); also extending along the Himalayas from India to China.
FLORISTIC CATEGORY Afro-montane and Himalayan Regions.

625 **Cyanotis foecunda** *DC. ex Hassk.*, Commel. Ind. :110 (1870); C. B. Clarke in F.T.A. 8:80 (1901); Wickens, For. Bull. 14(N.S.) :39 (1969); Cuf., Enum. :1520 (1971).

DARFUR Jebel Marra, piedmont and massif, 1160–1830 m; lowland plain, 1060 m; savanna. *Wickens* 1839b, 2102, 2249 & 2794.
DISTRIBUTION Cameroon (Mandara Mts.), Sudan Republic (Darfur), Ethiopia, Somali Republic and south through E. Africa to Rhodesia and SW. Africa.
FLORISTIC CATEGORY Sudano-Zambezian Region.

626 **Cyanotis lanata** *Benth.* in Hook., Fl. Nigrit. :542 (1849); C. B. Clarke in F.T.A. 8:80 (1901); Broun & Massey, F.S. :390 (1929); Andr., F.P.S. 3:247, fig. 67 (1956); Brenan in F.W.T.A. ed. 2, 3:40 (1968); Cuf., Enum. :1520 (1971).
C. schweinfurthii Hassk. in Schweinf., Beitr. Fl. Aethiop. :295 (1867), **synon. nov.**
DARFUR Jebel Marra, piedmont, 1160 m; moist rock crevices. *Wickens* 2127 & 2272.
DISTRIBUTION Senegal to Cameroon and eastwards to Ethiopia, south through E. Africa to the Transvaal. In the Sudan it is found in the southern provinces.
FLORISTIC CATEGORY Sudano-Zambezian Region.

627 **Murdannia simplex** (*Vahl*) Brenan in Kew Bull. 6:186 (1952); Andr., F.P.S. 3:250, fig. 69 (1956); J. K. Morton in Journ. Linn. Soc. Bot. 60:202 (1967); Brenan in F.W.T.A. ed. 2, 3:24, fig. 327 (1968); Cuf., Enum. :1519 (1971).
Commelina simplex Vahl, Enum., 2:177 (1806).
Aneilema sinicum Ker-Gawl. in Bot. Reg. t.659 (1822); C. B. Clarke in F.T.A. 8:63 (1901); Broun & Massey, F.S. :389 (1929).
A. sinicum Ker-Gawl. var. *longifolia* (Hook.) C. B. Clarke in F.T.A. 8:64 (1901); Broun & Massey, F.S. :389 (1929).
DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1920.
DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Natal; Transvaal and SW. Africa; also in Madagascar and SE. Asia.
FLORISTIC CATEGORY Palaeotropical.

Zingiberaceae

628 **Kaempferia rosea** *Schweinf. ex K. Schum.* in Engl., Bot. Jahrb. 15:426 (1893); Baker in F.T.A. 7:295 (1898); Broun & Massey, F.S. :394 (1929); Andr., F.P.S. 3:255 (1956).
DARFUR Lowland plain, 1020–1100 m; marshy places. *Lynes* 162; *Wickens* 1802.
DISTRIBUTION Southern provinces and in the Nuba Mountains of the Sudan Republic and south through E. Africa to Malawi, Rhodesia and Angola.
FLORISTIC CATEGORY Sudano-Zambezian Region.

Liliaceae

629 **Albuca sudanica** *A. Chev.* in Mém. Soc. Bot. Fr. 2, 8:93 (1908); Hepper in Kew Bull. 21:494 (1968) & F.W.T.A. ed. 2, 3:104 (1968).
DARFUR Jebel Marra, piedmont and massif, 1160–1980 m; lowland plain, 1030 m; savanna and upland meadow. *Wickens* 1297, 1396, 1876, 2489, 2852, 2963 & 2984. Vernacular name: (Fur) *jeiga*; (Arabic) *bereid*.
DISTRIBUTION Portuguese Guinea to Cameroon and eastwards to the Sudan Republic (Darfur).
FLORISTIC CATEGORY Sudanian Domain.
Note: *Albuca septentrionalis* Quézel in Bull. Soc. Hist. Afr. Nord 104: (1957) & Univ. Alger Inst. Rech. Sahar. Mém. 4:124, pl. 3B (1958) from Tibesti may possibly belong here. It closely resembles a dwarf form with a congested inflorescence (*Wickens* 2984) from Gur Lambang. More material however is required in order to investigate the apparent variation in this species.

630 **Aloë elegans** *Tod.*, Hort. Bot. Panorm. 2:25, t.29 (1880); Reynolds in Journ. S. Afr. Bot. 22:153 (1956) & Aloes Trop. Afr. :203, figs. 204–6, pl. 43 (1966); Cuf., Enum. :1544 (1971).
[*A. commutata* sensu Lester-Garland in Journ. Bot. 59:47 (1921); Broun & Massey, F.S. :375 (1929); MacLeay in Sudan Notes & Rec. 44:141 (1963), *non* Tod. (1876).]
DARFUR Jebel Marra, massif, 1900–2300 m; upland grassland. *Lynes* 21; *Drar* 2079 & 2336 (both CAI!); *Wickens* 2626; *Kassas* 721 (KHU & CAI, *n.v.*).
Wickens 1201 (sterile), from Golol, 1340 m; probably belongs here. The Golol specimen had been brought down from Tora Tonga by a Forestry Officer and planted in his garden; other specimens have been sent to private gardens in El Obeid etc. Vernacular name: (Fur) *sorrah*.
DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia (Map 159).
FLORISTIC CATEGORY Ethiopian-montane.
Note. Allied to *A. chabaudii* Schönl. from Malawi, Zambia, Rhodesia and the Transvaal and *A. mzimbana* Christ. from Malawi and Zambia (Reynolds *l. c.* 1956).

631 **Asparagus africanus** *Lam.*, Encycl. Méth. Bot. 1:295 (1783); Baker in F.T.A. 7:433 (1898); Norman in Journ. Bot. 62:135 (1924); Hepper, F.W.T.A. ed. 2, 3:94, fig. 349 (1968); Cuf., Enum. :1562 (1971).
[*A. asiaticus* sensu Baker in F.T.A. 7:432 (1898); Broun & Massey, F.S. :374 (1929); Wickens, For. Bull. 14(N.S.) :39 (1969); Cuf., Enum. :1563 (1971), *non* L. (1735).]
DARFUR Jebel Marra, massif, 1850 m; lowland plain, gallery forest. *Lynes* 12; *Wickens* 1437; *Kamil* 1209. Vernacular name: (Fur) *gnarrug*.
DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in Arabia. In the Sudan it is found in the Red Sea Hills and southern provinces.
FLORISTIC CATEGORY Sudano-Zambezian Region.

632 **Asparagus flagellaris** (*Kunth*) Baker in Journ. Linn. Soc. Bot. 14:614 (1875) & in F.T.A. 7:430 (1898); Andr., F.P.S. 3:263 (1956); Hepper, F.W.T.A. ed. 2, 3:93 (1968); Quézel, Dossier 5:133 (1969); Cuf., Enum. :1564 (1971).
Asparagopsis flagellaris Kunth, Enum. Pl. 5:103 (1850).
Asparagus pauli-guilelmi Solms-Laub. in Schweinf., Beitr. Fl. Aethiop. :203 (1867); Baker in F.T.A. 7:428 (1898), incl. var. *daltoni* Baker; Broun & Massey, F.S. :374 (1929).
DARFUR Jebel Marra, massif, 1900 m; lowland plain, 790–900 m; savanna. *Wickens* 1646 & 2903; *Kassas* 381 (KHU & CAI, *n.v.*).
Vernacular name: (Fur) *narro*; (Arabic) *sirreh*. A paste from the roots is used for treating ear-ache.
DISTRIBUTION Ivory Coast to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Zambia and Angola. Widespread through the southern provinces of the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian Region.

633 **Chlorophytum affine** *Baker* in Trans. Linn. Soc. 29:160, t.104 (1875), in Journ. Linn. Soc. Bot. 15:327 (1878) & in F.T.A. 7:507 (1898); Hanid in Kew Bull. 29:586 (1974).
Anthericum pubirachis Baker in Journ. Linn. Soc. Bot. 15:302 (1876) & in F.T.A. 7:481 (1898); Hepper in F.W.T.A. ed. 2, 3:96 (1968).
A. taylorianum Rendle in Journ. Linn. Soc. Bot. 30:415 (1895); Baker in F.T.A. 7:492 (1898).
var. **curviscapum** (*Poelln.*) Hanid in Kew Bull. 29:586, fig. 2 (1974).
Anthericum curviscapum Poelln. in Fedde, Repert 51:122 (1942).
DARFUR Lowland, rock crevices, 1130 m; *Wickens* 1983.
DISTRIBUTION (var. *curviscapum*) Cameroon to the Sudan Republic (Darfur) and south through East Africa to Malawi and Rhodesia; var. *affine* with a similar distribution but extending to Senegal.
FLORISTIC CATEGORY Sudano-Zambezian Region.

- 634 **Chlorophytum blepharophyllum** Schweinf. ex Baker in Journ. Linn. Soc. Bot. 15:327 (1876); Baker in F.T.A. 7:501 (1898); Broun & Massey, F.S. 3:78 (1929); Andr., F.P.S. 3:267 (1956); Hepper, F.W.T.A. ed. 2, 3:100 (1968); Cuf., Enum. 1:533 (1971).
C. ciliatum Baker in Journ. Bot. 16:325 (1878) & in F.T.A. 7:505 (1898); Broun & Massey, F.S. 3:78 (1929).
 DARFUR Lowland plain, 1280 m; savanna. *Wickens* 1968.
 DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic (and Ethiopia *vide* Cufodontis) and south through E. Africa to Rhodesia and Mozambique.
 FLORISTIC CATEGORY Sudano-Zambezian Region.
- 635 **Chlorophytum gallabatense** Schweinf. ex Baker in F.T.A. 7:504 (1898); Broun & Massey, F.S. 3:78 (1929); Andr., F.P.S. 3:267 (1956); Hepper, F.W.T.A. ed. 2, 3:99 (1968); Cuf., Enum. 1:534 (1971).
 DARFUR Jebel Marra, foothills; 1280–1400 m. *Wickens* 1827 & 1834. Vernacular name: (Arabic) *bereid*.
 DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to Rhodesia and Mozambique. In the Sudan it occurs in the southern provinces.
 FLORISTIC CATEGORY Sudano-Zambezian Region.
- 636 **Chlorophytum geophilum** Peter ex Poelln. in Ber. Deutsch. Bot. Ges. 61:127 (1943); Hepper, F.W.T.A. ed. 2, 3:100 (1968).
 DARFUR Lowland plain, 1000 m; savanna. *Wickens* 2006.
 DISTRIBUTION Guinée Republic to Cameroon eastwards to the Sudan (Jebel Marra and Mt. Tungu, on the Congo border), and in Tanzania and Zambia; not common anywhere in its distribution range (Map 160).
 FLORISTIC CATEGORY Sudanian Domain with Zambezian extensions.
- 637 **Chlorophytum schweinfurthii** Baker in F.T.A. 7:503 (1898); Broun & Massey, F.S. 3:78 (1929); Andr., F.P.S. 3:267 (1956); Cuf., Enum. 1:536 (1971).
 [*C. breviscapum* sensu Broun & Massey, F.S. 3:79 (1929), *non* Dammer (1912).]
 DARFUR Jebel Marra, piedmont and massif, 1160–1830 m; basalt rock crevices. *Wickens* 1338, 1839a, 1848 & 1909.
 DISTRIBUTION Southern provinces of the Sudan Republic (and Ethiopia *vide* Cufodontis).
 FLORISTIC CATEGORY Eastern Sudanian Domain.
- 638 **Chlorophytum tuberosum** (Roxb.) Baker in Journ. Linn. Soc. Bot. 15:332 (1876) & in F.T.A. 7:508 (1898); Broun & Massey, F.S. 3:79 (1929); Andr., F.P.S. 3:269 (1956); Hepper, F.W.T.A. ed. 2, 3:102 (1968); Quézel, Dossier 5:133 (1969); Cuf., Enum. 1:537 (1971).
Ornithogalum tuberosum Roxb., Pl. Cor. 2:20, t.138 (1798).
 DARFUR Jebel Marra, foothills, 1280–1525 m; lowland plain, 600–1020 m; savanna, moist depressions. *Aglen* 49; *Wickens* 1771, 1826, 2000 & 2026. Abundant and widespread on the basement soils, noticeably absent from the volcanic soils. Vernacular name: (Fur) *daou* or *narah*; (Arabic) *bereid*.
 DISTRIBUTION N. Nigeria, Central African Republic, Sudan Republic, Ethiopia, Uganda, Kenya and Tanzania. Widespread in the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.
- 639 **Dipcadi viride** (L.) Moench, Méthod. Suppl. 267 (1794); Baker in Journ. Linn. Soc. Bot. 11:401 (1870) & in F.T.A. 7:523 (1898); Cuf., Enum. 1:559 (1971).
Hyacinthus viridis L., Sp. Pl. 454 (1753).
Dipcadi tacazeum (Hochst. ex A. Rich.) Baker in Journ. Linn. Soc. Bot. 11:400 (1870) & in F.T.A. 7:520 (1898); Broun & Massey, F.S. 3:81 (1929); Andr., F.P.S. 3:269 (1956); Hepper, F.W.T.A. ed. 2, 3:106 (1968); Cuf., Enum. 1:558 (1971) **synon. nov.**
D. occidentale Baker in Bull. Misc. Inf. Kew 1895:119 (1895) & in F.T.A. 7:521 (1898).
D. lanceolatum Baker in Journ. Bot. 16:322 (1878); Broun & Massey, F.S. 3:81 (1929); Andr., F.P.S. 3:269 (1956); Cuf., Enum. 1:558 (1971).
 DARFUR Jebel Marra, piedmont and foothills, 1160–1280 m; lowland plain, 1020–1280 m; savanna, moist depressions. *Wickens* 1799, 1806, 1891, 1902, 1963, 2847, & 2850 (2847 & 2850 are under cultivation at Kew).
 DISTRIBUTION Southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to the Cape.
 FLORISTIC CATEGORY Afriental and Zambezian Domains.
- 640 **Drimiopsis barteri** Baker in Saunders, Ref. Bot. 3, App. 18 (1870) & in F.T.A. 7:543 (1898); Andr., F.P.S. 3:269 (1956); Hepper, F.W.T.A. ed. 2, 3:104, fig. 353 (1968).
 DARFUR Lowland plain, 1280 m; savanna. *Wickens* 1960.
 DISTRIBUTION Ghana, N. Nigeria, Cameroon, Central African Republic and Sudan Republic (Map 161). No further specimens seen for the Sudan but recorded from Equatoria *vide* Andrews l. c.
 FLORISTIC CATEGORY Sudanian Domain.
- 641 **Gloriosa superba** L., Sp. Pl. 305 (1753); Baker in F.T.A. 7:563 (1898); Hepper, F.W.T.A. ed. 2, 3:106 (1968); Field in Kew Bull. 25:243 (1971); Cuf., Enum. 1:527 (1971).
G. simplex L., Mant. 62 (1767); Andr., F.P.S. 3:271, fig. 75 (1956); Hepper, F.W.T.A. ed. 2, 3:106 (1968); Quézel, Dossier 5:133 (1969); Cuf., Enum. 1:526 (1971).
G. virens Lindl. in Bot. Mag. t.2539 (1825); Baker in F.T.A. 7:563 (1898); Broun & Massey, F.S. 3:84 (1929).
G. abyssinica A. Rich., Tent. Fl. Abyss. 2:322 (1851); Baker in F.T.A. 7:565 (1898).
G. virens Lindl. var. *grandiflora* (Hook.) Baker in Journ. Linn. Soc. Bot. 17:458 (1879) & in F.T.A. 7:564 (1898); Broun & Massey, F.S. 3:84 (1929).
G. carsoni Baker in Bull. Misc. Inf. Kew 1895:74 (1895) & in F.T.A. 7:565 (1898).
G. minor Rendle in Journ. Bot. 34:132 (1896); Baker in F.T.A. 7:564 (1898).
 DARFUR Jebel Marra, piedmont, 1160 m; lowland plain 1020–1100 m; savanna. *Lynes* 618 (BM!); *Wickens* 2003, 2052 & 2207. Vernacular name: (Fur) *tamen tur* or *tamen es*; (Arabic) *simbair*.
 DISTRIBUTION Gambia to Sierra Leone eastwards to the Somali Republic and south through East Africa to the Cape; widespread in SE. Asia. Widespread in the Sudan in the Red Sea Hills, central and southern provinces.
 FLORISTIC CATEGORY Palaeotropical.
- 642 **Iphigenia ledermannii** Engler & K. Krause in Engl., Bot. Jahrb. 45:123 (1910); Hepper in Kew Bull. 21:497 (1968) & F.W.T.A. ed. 2, 3:106 (1968).
 DARFUR Lowland plain, 1020 m; rock crevices. *Wickens* 1955 & 2084.
 DISTRIBUTION Ivory Coast to Cameroon eastwards to the Sudan Republic (Darfur Province).
 FLORISTIC CATEGORY Sudanian Domain.
- 643 **Scilla maesta** Baker in Saunders, Ref. Bot. 3, App. 10 (1870) & in F.T.A. 7:552 (1898); Broun & Massey, F.S. 3:83 (1929); Andr., F.P.S. 3:274 (1956).
 DARFUR Jebel Marra piedmont 1160 m; lowland plain, 900 m; savanna. *Wickens* 1818, 1864 & 2864. Vernacular name. (Arabic) *bassel el teir*.
 DISTRIBUTION Southern provinces of the Sudan Republic, Uganda, Tanzania, Malawi, Mozambique and Rhodesia.
 FLORISTIC CATEGORY Sudano-Zambezian Region.
- 644 **Urginea altissima** (L.f.) Baker in Journ. Linn. Soc. Bot. 13:221 (1872) & in F.T.A. 7:538 (1898); Andr., F.P.S. 3:275, fig. 76 (1956); Hepper, F.W.T.A. ed. 2, 3:102, fig. 352 (1968); Cuf. Enum. 1:554 (1971).
Ornithogalum altissimum L.f., Suppl. 199 (1781).
Drimiopsis barteri Baker in Journ. Linn. Soc. Bot. 11:423 (1870) & F.T.A. 7:526 (1898).

Urginea micrantha (A. Rich.) Solms-Laub. in Schweinf., Beitr. Fl. Aethiop. :294 (1867); Baker in F.T.A. 7:537 (1898); Broun & Massey, F.S. :382 (1929); Cuf., Enum. :1556 (1971).

DARFUR Jebel Marra, piedmont and massif, 1160–1750 m; lowland plain, 1030 m; savanna. *Lynes* 103; *Wickens* 1506, 1599 & 2919. Vernacular name: (Fur & Arabic) *bereid*.

DISTRIBUTION Senegal to Cameroon and eastwards to the Somali Republic, south through E. Africa to Rhodesia and Angola. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

645 ***Urginea indica*** (Roxb.) Kunth, Enum. Pl. 4:333 (1843); Baker in F.T.A. 7:540 (1898); Broun & Massey, F.S. :382 (1929); Andr., F.P.S. 3:274 (1956); Hepper, F.W.T.A. ed. 2, 3:102 (1968); Cuf., Enum. :1555 (1971).

Scilla indica Roxb., Hort. Beng. :24 (1814).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1582. DISTRIBUTION Mauritania to N. Nigeria eastwards to Ethiopia and south through Kenya, Tanzania to Zambia and Rhodesia; also extending to India and tropical Asia. In the Sudan it is found in the southern provinces.

FLORISTIC CATEGORY Palaeotropical.

Pontederiaceae

646 ***Heteranthera callifolia*** Kunth, Enum. Pl. 4:121 (*sphalm.* 123) (1843), as “*callaefolia*”; N. E. Brown in F.T.A. 8:2 (1901); Andr., F.P.S. 3:276 (1956); Verdc. in Kew Bull. 1957:352 (1957) & F.T.E.A. Ponted. :8, fig. 3 (1968); Hepper, F.W.T.A. ed. 2, 3:111 (1968).

H. kotschyana Fenzl ex Solms-Laub. in Schweinf., Beitr. Fl. Aethiop. :205, 294 (1867); N. E. Brown in F.T.A. 8:3 (1901); Broun & Massey, F.S. :384 (1929).

DARFUR Lowland plain, 1020 m; aquatic. *Wickens* 2775. DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic and south through E. Africa to N. Transvaal and SW. Africa.

FLORISTIC CATEGORY Sudano-Zambezian Region. A S. American genus with one species in Africa.

Araceae

647 ***Amorphophallus abyssinicus*** (A. Rich.) N. E. Brown in F.T.A. 8:160 (1901), *non* Gombocz (1936); Milne-Redh. in Kew Bull. 5:382 (1951); Andr., F.P.S. 3:280 (1956); Hepper, F.W.T.A. ed. 2, 3:118, fig. 359 (1968); Cuf., Enum. :1501 (1971).

Arum abyssinicum A. Rich., Tent. Fl. Abyss. 2:352 (1851).

Amorphophallus schweinfurthii (Engler) N. E. Brown in F.T.A. 8:149 (1901); Broun & Massey, F.S. :370 (1929).

A. barteri N. E. Brown in F.T.A. 8:151 (1901).

DARFUR Jebel Marra, piedmont and massif, 1160–1380 m; lowland plain, 1000 m; savanna. *Wickens* 1853, 2005 & 2513. Vernacular name: (Arabic) *sarbeh*.

DISTRIBUTION Ghana to Cameroon eastwards to Ethiopia and south through E. Africa to Rhodesia. Widespread in the southern provinces of the Sudan (Map—Milne-Redh. *l. c.*, fig. 9).

FLORISTIC CATEGORY Sudano-Zambezian Region.

648 ***Pistia stratiotes*** L., Sp. Pl. :963 (1753); N. E. Brown in F.T.A. 8:140 (1901); Broun & Massey, F.S. :369 (1929); Andr., F.P.S. 3:281 (1956); Hepper, F.W.T.A. ed. 2, 3:113 (1968); Cuf., Enum. :1504 (1971).

DARFUR Lowland plain, 600 m; aquatic. *Wickens* 1633.

There is no evidence of this plant extending further upstream of Foro Borunga within the Wadi Azum system, where it could become a serious problem to the future expansion of irrigation.

Vernacular name: (Arabic) *moryoh*.

DISTRIBUTION Senegal eastwards to the rivers of central and southern provinces of the Sudan Republic and south to Natal and the Transvaal; widely distributed through the tropics.

FLORISTIC CATEGORY Pantropical.

649 ***Stylochiton borumensis*** N. E. Brown in F.T.A. 8:191 (1901).

S. lobatus N. E. Brown in F.T.A. 8:190 (1901), **synon. nov.**

[*S. kerensis* sensu N. E. Brown in F.T.A. 8:193 (1901) pro specim.

Pfund 761; Andr., F.P.S. 3:283 (1956); Quézel Dossier, 5:133 (1969); Cuf., Enum. :1502 (1971), *non* N. E. Brown (1901), sensu stricto.]

DARFUR Lowland plain, 1020 m; waste places. *Wickens* 1760.

No inflorescences observed despite continuous observation over eighteen months (it was growing in my garden). This is a widespread species, throughout the lowlands of the survey area; also observed in Kordofan, again without flowers. Vernacular name: (Fur) *nurgud*. In times of famine the leaves are boiled in order to remove the bitter taste before eating.

DISTRIBUTION Central provinces of the Sudan Republic, Somali Republic, Kenya, Tanzania and Mozambique.

The genus has been poorly collected, with little correlated floral and vegetative material. It is at present impossible to work out the specific limits within the genus; further collections and studies of living plants are desirable.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Lemnaceae

650 ***Lemna minor*** L., Sp. Pl. :970 (1753); N. E. Brown in F.T.A. 8:202 (1901); Cuf., Enum. :1505 (1971); Hepper, F.T.E.A., Lemnaceae :4, fig. 1/3 (1973).

DARFUR Jebel Marra, piedmont 1160 m; aquatic. *Wickens* 2917.

DISTRIBUTION Widespread through the warm temperate regions of the world. No further specimens seen for the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

651 ***Lemna perpusilla*** Torrey, Fl. New York 2:245 (1843); Andr., F.P.S. 3:284 (1956); Daubs, Monogr. Lemnac.: 25, t.9 (1965); Hepper, F.T.E.A. Lemnac.: 4, fig. 1/4 (1973).

L. paucicostata Hegelm. ex Engelm. in Gray, Man. Bot. ed. 5, :681 (1867); N. E. Brown in F.T.A. 8:202 (1901); Norman, in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :373 (1929); Hepper, F.W.T.A. ed. 2, 3:129, fig. 361A (1968).

DARFUR Jebel Marra, piedmont and massif; lowland plain 1020 m; *Lynes* 46; *Dandy* 38 (BM); *Wickens* 1517 & 2837.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola; widespread in the tropics and warm temperate regions.

Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

Typhaceae

652 ***Typha domingensis*** Pers., Syn. Pl. 2: 532 (1807); Napper, F.T.E.A. Typhac. :2, fig. 1/1–8 (1971).

T. australis Schum. & Thonn., Beskr. Guin. Pl. :401 (1827);

N. E. Brown, in F.T.A. 8:135 (1901); Broun & Massey, F.S. :369 (1929); Andr., F.P.S. 3:285 (1956); Hepper, F.W.T.A. ed. 2, 3:131, fig. 362 (1968).

T. angustata Bory & Chaub., Expéd. Sci. Morée 3:338 (1833);

N. E. Brown in F.T.A. 8:134 (1901); Broun & Massey, F.S. :368 (1929); Andr., F.P.S. 3:284 (1956).

[*T. angustifolia* sensu N. E. Brown in F.T.A. 8:135 (1901); Broun & Massey F.S.: 369 (1929); Andr., F.P.S. 3:285 (1956); Cuf., Enum. :1195 (1968), *non* L. (1753).]

DARFUR Jebel Marra, piedmont and massif, 1160–2000 m; reed swamps. *Dandy* 170 (BM!); *Wickens* 1899 & 2975; *Kassas* 857 (KHU & CAI, *n.v.*); *Kamil* 1173.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique and Zambia; widely distributed in the warmer parts of the world.

FLORISTIC CATEGORY. Pantropical.

Amaryllidaceae

653 *Allium* sp.

A. alibile A. Rich., Tent. Fl. Abyss. 2:330 (1848); Baker in F.T.A. 7:516 (1898); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :380 (1924); Andr., F.P.S. 3:286 (1956). DARFUR Jebel Marra, massif (Nuringya), 2150 m. *Lynes* 37e (BM!). This specimen was identified by Norman from the description in F.T.A. There are no specimens of *A. alibile* from Ethiopia at Kew or the British Museum. It is almost certain that the *Lynes* specimen is from a cultivated species. The specimen is now with Mrs B. E. E. de Wilde-Duyfjes at Wageningen, who is preparing a monograph of the genus.

654 *Ammocharis tinneana* (Kotschy & Peyr.) Milne-Redh. & Schweick. in Journ. Linn. Soc. Bot. 52:177 (1939); Andr., F.P.S. 3:286 (1956); Cuf., Enum. :1576 (1971). *Crinum tinneanum* Kotschy & Peyr., Pl. Tinn. :44, fig. 21 (1867); Baker in F.T.A. 7:395 (1898); Broun & Massey, F.S. :391 (1929). *C. ammocharoides* Baker in Journ. Bot. 16:195 (1878) & in F.T.A. 7:397 (1898); Broun & Massey, F.S. :391 (1929). DARFUR Jebel Marra, foothills, 1400 m; lowland plain, 1020 m; savanna, shallow depressions. *Wickens* 1512 & 1833.

DISTRIBUTION Central and southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to Malawi, Rhodesia, Botswana and SW. Africa (Map Milne-Redhead & Schweick. l. c. p. 183).

FLORISTIC CATEGORY Sudano-Zambezian Region.

655 *Crinum ornatum* (Aiton) Bury, Hexandr. t.18 (1834); Andr., F.P.S. 3:287 (1956); Hepper, F.W.T.A. ed. 2, 3:134 (1968); Cuf., Enum. :1575 (1971). *Amaryllis ornata* Aiton, Hort. Kew, 1:418 (1789). *Crinum yucciflorum* Salisb., Parad. t.52 (1806); Baker in F.T.A. 7:399 (1898). *C. sanderanum* Baker in Gard. Chron. 22:102 (1884) & in F.T.A. 7:400 (1898). *C. scabrum* Herbert in Bot. Mag. 47, t.2180 (1820); Baker in F.T.A. 7:401 (1898); Broun & Massey, F.S. :392 (1929). DARFUR Jebel Marra, massif, 1525 m; lowland plain, 1020–1100 m; savanna. *Lynes* 74 & 616 (BM!); *Wickens* 1761; also observed growing gregariously at Abu Dima and Nyertete. The flower bud remains apparently fully developed but closed for about two weeks before opening shortly after dusk; by morning the flower has withered. Vernacular name: (Arabic) *bereid*. DISTRIBUTION Guinée Republic to Cameroon eastwards to the Somali Republic and south to Mozambique, Rhodesia and Angola. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

656 *Haemanthus multiflorus* Martyn, Monogr., with fig. (1795); Baker in F.T.A. 7:388 (1898); Broun & Massey, F.S. :392 (1929); Andr., F.P.S. 3:287 (1956); Hepper, F.W.T.A. ed. 2, 3:132 (1968); Quézel, Dossier 5:134 (1969); Cuf., Enum. :1574 (1971). *H. filiflorus* Hiern ex Baker in Journ. Bot. 16:194 (1878) & in F.T.A. 7:387 (1898); Broun & Massey, F.S. :392 (1929). *H. lynesii* Stapf in Bot. Mag. 148, t.8975 (1923). DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; gallery forest and moist, shady sites in savanna. *Lynes* 614; *Macintosh* 129; *Aglen* 38; *Wickens* 1815, 1910, 2012 & 2533 (2012 is growing at Kew).

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Iridaceae

657 *Gladiolus natalensis* (Ecklon) Reinw. ex Hook. in Curtis, Bot. Mag. sub. t.3084 (1831); Geerinck in Bull. Jard. Bot. Nat. Belge 42:281 (1972); Cuf., Enum. :1590 (1972); Levis, Obermeyer & Barnard, Journ. S. Afr. Bot. Suppl. Vol. 10:44 (1972). *Watsonia natalensis* Ecklon, Top. Verz. :34 (1827). *Gladiolus psittacinus* Hook., Bot. Mag. 57:t.3032 (1830); Andr., F.P.S. 3:293, fig. 82 (1956); Hepper, F.W.T.A. ed. 2, 3:141, fig. 367 (1968).

G. quartinianus A. Rich., Tent. Fl. Abyss. 2:306 (1851); Baker in F.T.A. 7:371 (1898); Broun & Massey, F.S. :393 (1927); Quézel, Dossier 5:134 (1969).

var. *natalensis*: Geerinck in *tom. cit.* :283 (1972).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1100 m; savanna. *Lynes* 614; *Wickens* 2092 & 2106.

DISTRIBUTION Mali to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; also in the Yemen. Widespread through the southern provinces of the Sudan; also found on Jebel Gurgeil.

FLORISTIC CATEGORY Sudano-Zambezian Region.

658 *Gladiolus unguiculatus* Baker in Journ. Linn. Soc. Bot. 16:178 (1877) & in F.T.A. 7:372 (1898); Broun & Massey, F.S. :393 (1929); Andr., F.P.S. 3:293 (1956); Hepper, F.W.T.A. ed. 2, 3:144 (1968).

DARFUR Lowland plain, 1280 m; savanna. *Wickens* 1967.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi and Zambia. Occurs in the southern provinces of the Sudan.

FLORISTIC CATEGORY. Sudano-Zambezian Region.

659 *Lapeirousia schimperi* (Aschers. & Klatt) Milne-Redh. in Bull. Misc. Inf. Kew 1934 :307 (1934); Wickens, For. Bull. 14(N.S.) :39 (1969); Quézel, Dossier 5:134 (1969); Cuf., Enum. :1592 (1972). *Tritonia schimperi* Aschers. & Klatt in Linnaea 34:697 (1866). *Acidanthera unicolor* Hochst. ex Baker in Journ. Linn. Soc. Bot. 16:160 (1877) & in F.T.A. 7:359 (1898). DARFUR Jebel Marra, piedmont and massif, 1160–2375 m; lowland plain, 1020 m; moist soils. *Jackson* 4073; *Wickens* 2101, 2126, 2589 & 2695.

DISTRIBUTION Sudan Republic (Jebel Marra and Jebel Gurgeil), Ethiopia, Kenya, Tanzania, Zambia, Rhodesia, Angola, Botswana and SW. Africa. (Map 162).

FLORISTIC CATEGORY Afriental and Zambezian Domains.

660 *Romulea camerooniana* Baker in Journ. Bot. 14:236 (1876) & in F.T.A. 7:345 (1898); Hepper, F.W.T.A. ed. 2, 3:139 (1968). *R. fischeri* Pax in Engl., Bot. Jahrb. 15:150 (1892); Baker in F.T.A. 7:345 (1898); Hedberg, Symb. Bot. Upsal. 15, 1:65 (1957); Cuf., Enum. :1584 (1972), **synon. nov.** *R. campanuloides* Harms in Engl., Bot. Jahrb. 19, Beibl. 47:28 (1894); Baker in F.T.A. 7:345 (1898); Cuf., Enum. :1584 (1972), **synon. nov.**

DARFUR Jebel Marra, massif, 2450–2750 m; upland meadow. *Wickens* 2401 & 2408.

DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra, Red Sea Hills and the Imatongs), Ethiopia, Uganda, Kenya, Tanzania, Malawi and Rhodesia (Map 163).

FLORISTIC CATEGORY Afro-montane.

Note: Hedberg *l. c.* (1957) separates *R. campanuloides* and *R. fischeri* on style length; in so doing he follows Baker *l. c.* (1898). Whether the style does or does not overtop the anthers has very little taxonomic significance in the Iridaceae. Style length is based on the degree of maturity of the flower and hence can not be used as a distinguishing character.

Dioscoreaceae

661 **Dioscorea bulbifera** *L.*, Sp. Pl. :1033 (1753); Andr., F.P.S. 3:295, fig. 83 (1956); Miège in F.W.T.A. ed. 2, 3:152, fig. 371g (1968); Cuf., Enum. :1582 (1972); Milne-Redh., F.T.E.A. Dioscor. :9 (1957).

[*D. sativa* sensu Baker in F.T.A. 7:415 (1898); Broun & Massey, F.S. :385 (1929) pro parte, *non* L. (1753) sensu stricto.]

DARFUR Jebel Marra, piedmont, 1160 m; basalt hill slopes.

Wickens 2193.

DISTRIBUTION Senegal eastwards to Ethiopia and southwards to Angola and Rhodesia; widespread through the tropics. Found in the central and southern provinces of the Sudan. Andrews, *l. c.* states that it is widely cultivated.

FLORISTIC CATEGORY Pantropical.

662 **Dioscorea quartiniana** *A. Rich.*, Tent. Fl. Abyss. 2:316, t.96A (1851); Andr., F.P.S. 3:297 (1956), incl. vars. *phaseoloides* (Pax) Burkill & *schweinfurthiana* (Pax) Burkill; Miège in F.W.T.A. ed. 2, 3:151 (1968); Cuf., Enum. :1583 (1972); Milne-Redh., F.T.E.A. Dioscor. :23, fig. 2/2a (1975).

D. beccariana Martelli, Fl. Bogos. :83 (1886); Baker in F.T.A.

D. (1898); Broun & Massey, F.S. :386 (1929).

D. phaseoloides Pax in Engl., Bot. Jahrb. 15:149 (1892); Baker in *l. c.* (1898); Broun & Massey, F.S. :386 (1929).

D. schweinfurthiana Pax in *l. c.*, (1892).

DARFUR Lowland plain, 1020 m; scree slopes. *Wickens* 2346.

DISTRIBUTION Gambia to Nigeria eastwards to Ethiopia and south through E. Africa to Malawi, Rhodesia and Angola; also in Madagascar. Widely distributed in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

Agavaceae

663 **Sansevieria liberica** *Ger. & Labr.* in Bull. Mus. Hist. Nat.

Paris 1903:170, 173, fig. 4 (1903); N. E. Br. in Bull. Misc. Inf.

Kew 1915:247 (1915); Hepper, F.W.T.A. ed. 2, 3:159 (1968).

DARFUR Jebel Marra, piedmont, 1160 m; gallery forest. *Wickens* 1548 & 1946; *Kassas* 372 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *ree*; (Arabic) *zaff el fil*. The leaf fibres are used for cordage and for stuffing saddles.

DISTRIBUTION Sierra Leone to the Cameroon and eastwards to the Sudan Republic (Jebel Marra) (Map 164).

FLORISTIC CATEGORY Western Sudanian Domain.

Palmae

664 **Borassus aethiopum** *Mart.*, Münch. Gel. Anzeig. :639 (1838) & :46 (1839); Andr., F.P.S. 3:302 (1956); Russell in F.W.T.A. ed. 2, 3:168 (1968); Sahni, Trees N. Sudan :111, fig. 48 (1968); Cuf., Enum. :1499 (1971).

B. flabellifera L. var. *aethiopum* (Mart.) Warb. in Engl. Pflanzenw.

Ost-Afr. B:20, C:130 (1895); Wright in F.T.A. 8:117 (1901);

Broun & Massey, F.S. :402 (1929).

DARFUR Dulmoinya, pure stands on the delta fans of the minor tributaries to the Wadi Saleh, c.700 m; sporadic occurrences throughout the basement complex lowland area. No specimens collected. Vernacular name: (Fur) *gugurr*; (Arabic) *deleib*. During times of famine the elongated root stock of young trees is ground into flour (Fur – *motei*; Arabic – *haolog*). The young nuts contain a sweet liquid, which is drunk. The fleshy fibre around the nut is eaten. The wood is heavy and durable and is used for building purposes. The leaf fibres are used for cordage and the leaves for thatching.

Due to its economic value the trees are never destroyed; young seedlings are protected. It is believed that the pure stands along the Wadi Saleh have developed fairly recently from colonisation of land that was formerly under cultivation.

DISTRIBUTION Senegal to N. Nigeria eastwards to the Sudan

Republic and south through E. Africa to the Transvaal.

Introduced into Ethiopia *vide* Breitenbach, Indig. Trees Ethiop.

:288 (1963). The distribution is imperfectly known as the species,

like so many of the Palmae, is rarely collected. Widespread

through the central and southern provinces of the Sudan, often

forming pure stands south of 12°N.

FLORISTIC CATEGORY Sudano-Zambezian Region.

665 **Hyphaene thebaica** (*L.*) *Mart.*, Hist. Nat. Palm. 3:226, t.131–3 (1839); Wright in F.T.A. 8:120 (1901); Broun & Massey, F.S. :402 (1929); Andr., F.P.S. 3:304, fig. 85 (1956); Karschon in La-Yaaran 12:3–8 (1962); Russell in F.W.T.A. ed. 2, 3:169 (1968); Sahni, Trees N. Sudan :114, fig. 49 (1968); Cuf., Enum. :199 (1971).

Corypha thebaica L., Sp. Pl. :1187 (1753).

DARFUR Sporadic occurrences throughout the basement complex

plain. No specimens collected. Vernacular name: (Fur) *doma*;

(Arabic) *dom*. The fruits are edible. The kernels are pounded into

flour; the rind gives a mildly scented 'honey'. The leaves are used

for matting, thatching and saddle pads; leaf fibres used for

cordage.

DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic, Kenya and Tanzania; also in Egypt, Sinai and Arabia. The distribution is imperfectly known. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudanian, Afroriental and South Arabian Domains.

666 **Phoenix reclinata** *Jacq.*, Fragm. 1:27, t.24 (1801); Wright in F.T.A. 8:103 (1901); Broun & Massey, F.S. :401 (1929); Andr., F.P.S. 3:304 (1956); Russell in F.W.T.A. ed. 2, 3:169 (1968); Cuf., Enum. :1496 (1971).

DARFUR Jebel Marra, piedmont, 1160 m; river bank. *Wickens* 1058;

Kassas 360:15 (KHU & CAI, *n.v.*). Clumps of this palm have

been observed at the base of the waterfalls at Mortagello and

Kronga, with occasional occurrences along the streams on the

south-western slopes of the massif. The roots are reputed to

produce an erotic stimulant, El Hamidi in Planta Med. 18:279

(1970).

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Natal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Hypoxidaceae

667 **Curculigo pilosa** (*Schum. & Thonn.*) *Engl.* in Engl. & Drude, Veg. der Erde 9,2:353 (1908); Andr., F.P.S. 3:306, fig. 86 (1956); Hepper, F.W.T.A. ed. 2, 3:174, fig. 377 (1968); Cuf., Enum. :1577 (1971).

Gethyllis pilosa Schum. & Thonn., Beskr. Guin. Pl. :172 (1827).

Curculigo gallabatensis Schweinf. ex Baker in Trans. Linn. Soc. II,

Bot. 1:266 (1878) & in F.T.A. 7:383 (1898); Broun & Massey,

F.S. :391 (1929).

DARFUR Lowland plain, 1020 m; degraded savanna. *Wickens* 1774.

DISTRIBUTION Gambia to Cameroon eastwards to the Somali Republic and south through Uganda and Tanzania to Zambia; Also in Madagascar. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

668 **Hypoxis angustifolia** *Lam.*, *Encycl. Méth. Bot.* 3:182 (1789); Baker in *F.T.A.* 7:378 (1898); Broun & Massey, *F.S.* :391 (1929); Andr., *F.P.S.* 3:306 (1956); Hepper, *F.W.T.A.* ed. 2, 3:172 (1968); Quézel, *Dossier* 5:134 (1969); Cuf., *Enum.*, :1577 (1971).

H. camerooniana Baker in *F.T.A.* 7:377 (1898).

DARFUR Jebel Marra, piedmont and massif, 1160–1950 m; basalt rocks. *Wickens* 1844, 1851, 1945 & 2150.

DISTRIBUTION Guinée Republic to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and Angola; also in Madagascar (Map 165). Occurs on Jebel Gurgeil and in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

Taccaceae

669 **Tacca leontopetaloides** (*L.*) *Kuntze*, *Rev. Gen.* 2:704 (1891); Andr., *F.P.S.* 3:308 (1956); Carter, *F.T.E.A. Tacc.* :1, fig. 1 (1962); Hepper, *F.W.T.A.* ed. 2, 3:176, fig. 379 (1968); Cuf., *Enum.* :1581 (1972); Drenth in *Blumen* 20:375, map 1, pl. 1, 1–7 (1972).

Leontice leontopetaloides *L.*, *Sp. Pl.* :313 (1753).

Tacca pinnatifida *J. R. & G. Forster*, *Char. Gen.* :70, t.35 (1776); Baker in *F.T.A.* 7:413 (1898); Broun & Massey, *F.S.* :385 (1929).

DARFUR Jebel Marra foothills, 1280 m; lowland plain, 1130 m; savanna. *Wickens* 1825, 1969 & 1984. Fruit edible.

DISTRIBUTION Sierra Leone to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi; also in Madagascar, SE. Asia and Australia. (Map—Drenth *l. c.*). In the Sudan it is found in the northern provinces along the border with Ethiopia, also in the southern provinces.

FLORISTIC CATEGORY Palaeotropical.

Orchidaceae

670 **Ansellia gigantea** *Reichenb. f.* in *Linnaea* 20:673 (1874). var. **nilotica** (*Baker*) *Summerh.* in *Bull. Misc. Inf. Kew* 1937:462 (1937); Andr., *F.P.S.* 3:312 (1956); *Summerh.* in *F.W.T.A.* ed. 2, 3:214 (1968); *Wickens*, *For. Bull.* 14(N.S.) :39 (1969). *A. africana* *Lindl.* var. *nilotica* *Baker* in *Trans. Linn. Soc.* 29:154 (1875).

A. nilotica (*Baker*) *N. E. Brown* in *Lindernia* 2:36 (1886); *Rolf* in *F.T.A.* 7:101 (1898).

DARFUR Jebel Marra, massif, 1350–1765 m; epiphyte on *Ficus ingens* var. *tomentosa*. *Wickens* 1314 & 1179; *Kassas* 169 (KHU & CAI, *n.v.*). This epiphyte is common on *Ficus* spp. and *Acacia albida* in the Kronga area of the Jebel Marra massif. Vernacular name: (Arabic) *beida*.

DISTRIBUTION N. Nigeria and Central African Republic to the Sudan and south through E. Africa to Rhodesia and Mozambique (Map 166). Occurs in the southern provinces of the Sudan *vide* *F. W. Andrews l. c.* but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambezian Region.

671 **Disperis anthoceros** *Reichenb. f.*, *Otia Bot. Hamburg* 2:103 (1881); *Rolf* in *F.T.A.* 7:292 (1898); *Summerh.*, *F.T.E.A. Orchid.* :229 (1968) & in *F.W.T.A.* ed. 2, 3:205 (1968); *Wickens*, *For. Bull.* 14(N.S.):39 (1969). var. **anthoceros**; *Summerh.*, *F.T.E.A. Orchid.* :229, fig. 39/14 (1968).

DARFUR Jebel Marra, massif, 1375 m; gallery forest, growing in deep humus. *Wickens* 2520.

DISTRIBUTION N. Nigeria, Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to Natal and the Transvaal (Map 167).

FLORISTIC CATEGORY Sudano-Zambezian Region.

672 **Habenaria armatissima** *Reichenb. f.*, *Otia Bot. Hamburg* 2:98 (1881); *Rolf* in *F.T.A.* 7:227 (1898); Broun & Massey, *F.S.* :400 (1929); *Crowfoot*, *Fl. Pl. N. & Centr. Sudan* t.156 (1929); *Summerh.*, *F.T.E.A. Orchid.* :128, fig. 23 (1968) & in *F.W.T.A.* ed. 2, 3:198 (1968); *Cuf.*, *Enum.* :1600 (1972).

H. sp. sensu Broun & Massey, *F.S.* :400 (1929).

DARFUR Jebel Marra, foothills, 1130 m; lowland plain, 1050–1100 m; savanna. *Wickens* 1798, 2103 & 2251.

Wickens 1798 was kept under observation at Zalingei. The buds took three weeks to open, although they appeared to be on the point of opening when first collected. The spur took a further ten days to uncoil, then, within twenty four hours the flowers were completely open

DISTRIBUTION Mali, N. Nigeria and Cameroon, Sudan Republic (Darfur), Ethiopia and south through Kenya and Tanzania to SW. Africa and Mozambique (Map 168). No further specimens seen for the Sudan but recorded from the Red Sea Hills *vide* *Crowfoot, l. c.* and Equatoria *vide* Broun & Massey *l. c.* *Andrews* did not recognize these records for his flora.

FLORISTIC CATEGORY Sudano-Zambezian Region.

673 **Habenaria bongensium** *Reichenb. f.*, *Otia Bot. Hamburg* 1:58 (1878); *Rolf* in *F.T.A.* 7:233 (1898); Broun & Massey *F.S.* :400 (1929); Andr., *F.P.S.* 3:323 (1956); *Summerh.* in *F.W.T.A.* ed. 2, 3:196 (1968).

DARFUR Jebel Marra, massif, 2600 m; upland grassland.

Wickens 2670.

DISTRIBUTION Senegal, N. Nigeria, Cameroon and the southern provinces of the Sudan Republic (Map 169).

FLORISTIC CATEGORY Sudanian Domain.

674 **Habenaria cirrhata** (*Lindl.*) *Reichenb. f.* in *Flora* 48:180 (1865); *Rolf* in *F.T.A.* 7:248 (1898); Broun & Massey, *F.S.* :400 (1929); Andr., *F.P.S.* 3:324 (1956); *Summerh.*, *F.T.E.A. Orchid.* :112 (1968) & in *F.W.T.A.* ed. 2, 3:198 (1968); *Cuf.*, *Enum.* :1600 (1972).

Bonatea cirrhata *Lindl.*, *Gen. & Sp. Orch.* :327 (1835).

Habenaria schweinfurthii *Reichenb. f.*, *Otia Bot. Hamburg* 1:58 (1878).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Blair* 390.

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi and Zambia; also in Madagascar (Map 170). No other specimens seen for the Sudan but recorded on the northern Ethiopian border and from Equatorial Province *vide* *Andrews l. c.*

FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

675 **Habenaria filicornis** *Lindl.*, *Gen. & Sp. Orch.* :318 (1835); *Rolf* in *F.T.A.* 7:216 (1898); *Summerh.* in *Kew Bull.* 8:129 (1953); Andr., *F.P.S.* 3:322 (1956); *Summerh.*, *F.T.E.A. Orchid.* :54 (1968) & in *F.W.T.A.* ed. 2, 3:193 (1968); *Cuf.*, *Enum.* :1602 (1972).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; savanna and upland grassland. *Wickens* 2229, 2449, 2607 & 2648.

DISTRIBUTION Ivory Coast and N. Nigeria, Sudan Republic (Jebel Marra and Imatongs), and Ethiopia, south through E. Africa to Rhodesia and Angola (Map 171).

FLORISTIC CATEGORY Sudano-Zambezian Region.

676 **Habenaria humilior** *Reichenb. f.*, *Otia Bot. Hamburg* 2:100 (1881); *Rolf* in *F.T.A.* 7:236 (1898); *Summerh.*, *F.T.E.A. Orchid.* :91 (1968); *Wickens*, *For. Bull.* 14(N.S.) :39 (1969); *Cuf.*, *Enum.* :1602 (1972).

H. hochstetterana *Kraenzlin* in *Engler, Bot. Jahrb.* 16:73 (1892); *Rolf* in *F.T.A.* 7:243 (1898); Andr., *F.P.S.* 3:323 (1956).

H. culicifera *Rendle* in *Journ. Bot.* 33:278 (1895); *Rolf* in *F.T.A.* 7:237 (1898).

DARFUR Jebel Marra, piedmont and massif, 1160–2600 m; marshy grassland. *Jackson* 4074; *Wickens* 2171, 2215, 2432, 2459, 2600, 2647, 2663 & 2690. Vernacular name. (Fur) *lomah*.

DISTRIBUTION Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and south through E. Africa to Malawi and Rhodesia (Map 172).

FLORISTIC CATEGORY Afriental and Zambeian Domains.

677 **Habenaria** ? sp. nov.

DARFUR Jebel Marra, massif (Kronga), 2000 m; occasional orchid in upland grassland. *Wickens* 2719.

678 **Habenaria** sp.

DARFUR Jebel Marra, massif (plateau between Abau and Deriba), 2700 m; frequent in turf with bracken. *Jackson* 3375 (too mature to name); Jebel Marra, massif (Golol), 1390 m; occasional orchid growing in shade, *Anogeissus* savanna, ash soils, *Wickens* 2544 (immature).

679 **Holothrix tridentata** (*Hook. f.*) *Reichenb. f.*, *Otia Bot.*

Hamburg 2:119 (1881); Rolfe in F.T.A. 7:193 (1898); Summerh. in F.W.T.A. ed. 2, 3:186 (1968); *Wickens*, *For. Bull.* 14(N.S.):39 (1969); *Cuf.*, *Enum.* :1598 (1972).

Peristylus tridentatus Hook. f. in *Journ. Linn. Soc. Bot.* 7:221 (1864).

Holothrix platyactyla Kraenzlin in *Engler, Bot. Jahrb.* 17:66 (1893); Rolfe in F.T.A. 7:193 (1898).

DARFUR Jebel Marra, massif, 2300 m; upland meadow, very rare. *Wickens* 2450.

DISTRIBUTION Cameroon Mtn., Sudan Republic (Jebel Marra) and Ethiopia (Choke Mtns.) (Map 173).

FLORISTIC CATEGORY Afro-montane.

680 **Nervilia kotschyi** (*Reichenb. f.*) *Schlechter* in *Engler, Bot.*

Jahrb. 45:404 (1911); Broun & Massey, F.S. :399 (1929); Andr., F.P.S. 3:324 (1956); Summerh. in F.W.T.A. ed. 2, 3:207 (1968).

Pogonia kotschyi Reichenb. f. in *Oestr. Bot. Zeit.* 1864:338 (1864); Rolfe in F.T.A. 7:187 (1898).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1805.¹

DISTRIBUTION Mali and N. Nigeria eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Angola and the Transvaal (Map 174).

FLORISTIC CATEGORY Sudano-Zambeian Region.

681 **Satyrion coriophoroïdes** *A. Rich.* in *Ann. Sci. Nat. II*,

14:274, t.18/XI, 1–5 (1840); Rolfe in F.T.A. 7:269 (1898); Andr., F.P.S. 3:325 (1956); Summerh., F.T.E.A. *Orchid.* :201 (1968) & in F.W.T.A. ed. 2, 3:201 (1968).

DARFUR Jebel Marra, massif, 1525–2600 m; upland grassland. *Wickens* 2133, 2451, 2646 & 2689.

DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and Kenya (Map 175).

FLORISTIC CATEGORY Afro-montane.

Juncaceae

682 **Juncus bufonius** *L.*, *Sp. Pl.* :328 (1753); Baker in F.T.A.

8:95 (1901); Carter, F.T.E.A. *Junc.* :2 (1966); *Cuf.*, *Enum.* :1522 (1971).

DARFUR Jebel Marra, massif, 1980–2300 m; irrigated gardens.

Wickens 1237 & 1459. Vernacular name. (Fur) *kulu korsoru*.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Kenya and Cape Province; also the temperate regions and the mountains and highlands of the tropics.

FLORISTIC CATEGORY Subcosmopolitan.

683 **Juncus dregeanus** *Kunth*, *Enum. Pl.* 3:344 (1841); Carter,

F.T.E.A. *Junc.* :4 (1966); *Cuf.*, *Enum.* :1523 (1971).

subsp. *bachitii* (*Hochst. ex Steud.*) *Hedberg*, *Symb. Bot. Upsal.* 15,

1:61, 263 (1957); Carter, F.T.E.A. *Junc.* :4, fig. 1/1–7 (1966);

Cuf., *Enum.* :1523 (1971).

(1) See note 7, p. 191.

J. bachitii Hochst. ex Steud., *Syn. Pl. Glum.* 2:305 (1855); Baker in F.T.A. 8:94 (1901).

[*J. dregeanus* sensu Andr., F.P.S. 3:326 (1956), non Kunth (1841) sensu stricto.]

DARFUR Jebel Marra, massif, 2300–2700 m; marshy plains. *Dandy* 124 (BM!); *Jackson* 3372; *Wickens* 2677.

DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra and the Imatongs) and Ethiopia southwards through E. Africa to Malawi and Rhodesia (Map 176).

FLORISTIC CATEGORY Afro-montane.

684 **Juncus punctorius** *Lf.*, *Suppl.* :208 (1781); Baker in

F.T.A. 8:93 (1901); *Cuf.*, *Enum.* :1525 (1971).

DARFUR Jebel Marra, massif, 1780–2300 m; marshy stream banks.

Wickens 1415, 1723 & 2879. Vernacular name: (Fur) *mair*.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Somali Republic and in Rhodesia, Natal, Transvaal and the Cape; also in N. Africa and W. Asia.

FLORISTIC CATEGORY Afriental and Zambeian Domains and Mediterranean Region.

Cyperaceae

685 **Bulbostylis densa** (*Wall.*) *Hand.-Mazz.* in *Karsten &*

Schenck, Veget. 20, 7:16 (1930); *Wickens*, *For. Bull.* 14(N.S.):39 (1969); *Cuf.*, *Enum.* :1481 (1970); Hooper in F.W.T.A. ed. 2,

3:318 (1972).

Scirpus densus Wall. in *Roxb., Fl. Brit. Ind.* ed. 1, 1:231 (1820).

Bulbostylis capillaris (L.) C. B. Clarke var. *trifida* (Nees) C. B. Clarke in Hook. f., *Fl. Brit. Ind.* 6:652 (1893) & in F.T.A. 8:438 (1902).

Fimbristylis minutissima Maire in *Bull. Soc. Hist. Nat. Afr. Nord.*

34:139 (1943); Quézel, *Univ. Alger Inst. Rech. Sahar. Mém.*

4:123 (1958).

F. marrana de Miré & Quézel in *Journ. Agric. Trop. et Bot. Appl.* 8:113, fig. 1 (1961), non rite publ.

var. **densa**; Hooper in *l. c.* (1972).

DARFUR Jebel Marra, massif, 2450–2900 m; upland meadow.

Bruneau de Miré s.n. (MARS!); *Wickens* 2393 & 2411.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi and Rhodesia; widespread through the tropics of the Old World. Known in the Sudan only from Jebel Marra and the Imatongs.

FLORISTIC CATEGORY Palaeotropical.

686 **Carex** sp. near **C. echinochloë** *Kunze.*

DARFUR Jebel Marra, Beldong, *Kassas* 351 (KHU & CAI!).

A poor specimen obviously close to *Carex echinochloë* Kunze and to *C. neo-chevalieri* Kükenthal, but more especially the latter (known range from Sierra Leone to N. Nigeria). This group of numerous closely related forms needs revising for the whole of Africa.

687 **Cyperus alopecuroides** *Rotb.*, *Descr. Pl. Rar. Programm.*

20 (1772) & *Descr. et Icon.* :38, t.8, fig. 2 (1773); Kükenthal in *Engl., Pflanzenr.* 4,20:71 (1935); Andr., F.P.S. 3:348 (1956);

Hooper in F.W.T.A. ed. 2, 3:285 (1972).

Juncellus alopecuroides (Rotb.) C. B. Clarke in Hook. f., *Fl. Brit.*

Ind. 6:595 (1893) & in F.T.A. 8:307 (1901); Broun & Massey, F.S. :407 (1929).

DARFUR Jebel Marra, piedmont, 1160–1280 m; river bank. *Lynes* 79a; *Wickens* 1008.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Botswana and SW. Africa; also in SE. Asia and the W. Indies. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pan-tropical.

688 **Cyperus cuspidatus** *Kunth* in *Humb., Bonpl. & Kunth,*

Nov. Gen. Sp. 1:204 (1815); Kükenthal in *Engl., Pflanzenr.*

4,20:261, fig. 29E (1936); Andr., F.P.S. 3:341 (1956); Hooper in

F.W.T.A. ed. 2, 3:291 (1972).

[*C. uncinatus* sensu C. B. Clarke in Dur. & Schinz, Consp. Fl. Afr. 5:580 (1895) & in F.T.A. 8:328 (1901); Broun & Massey, F.S. :409 (1929), *non* Poir. (1806).]

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 1172. DISTRIBUTION Sierra Leone to the Gabon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Mozambique and Angola; also in Madagascar, tropical Asia and America.

FLORISTIC CATEGORY Pantropical.

689 ***Cyperus digitatus* Roxb.**, Hort. Beng. :81 (1814); C. B. Clarke in F.T.A. 8:372 (1901); Broun & Massey, F.S. :416 (1929); Andr., F.P.S. 3:343 (1956); Hooper in F.W.T.A. ed. 2, 3:284 (1972).

subsp. ***auricomus* (Sieber ex Sprengel) Kükenenthal** in Bot. Notis. 1934:65 (1934); Andr., F.P.S. 3:343 (1956); Hooper in F.W.T.A. ed. 2, 3:284 (1972).

C. auricomus Sieber ex Sprengel, Syst. Veg. 1:230 (1824); C.B. Clarke in F.T.A. 8:373 (1901); Broun & Massey, F.S. :416 (1929); Cuf., Enum. :1418 (1970).

DARFUR Lowland plain, 1020 m; marshy ground. *Wickens* 1988. DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic (Ethiopia *fide* Cufodontis) and south through E. Africa to Rhodesia and SW. Africa.

FLORISTIC CATEGORY Sudano-Zambezian Region (species pantropical).

690 ***Cyperus esculentus* L.**, Sp. Pl. :45 (1753); C. B. Clarke in F.T.A. 8:355 (1901); Broun & Massey, F.S. :413 (1929); Kükenenthal in Engl., Pflanzenr. 4,20:116, fig. 14 (1935); Andr., F.P.S. 3:345 (1956); Quézel, Dossier 5:142 (1969); Cuf., Enum. :1424 (1970); Hooper in F.W.T.A. ed. 2, 3:286 (1972).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 580–1100 m; moist sites. *Lynes* 622; *Wickens* 1769, 1922, 1987, 2029 & 2079. Vernacular name: (Fur) *gerah*; (Arabic) *seid*.

DISTRIBUTION Sierra Leone to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; widespread through the tropics and subtropics. Widespread through the Sudan.

FLORISTIC CATEGORY Pantropical weed.

691 ***Cyperus exaltatus* Retz.**, Obs. Bot. 5:11 (1789); C. B. Clarke in F.T.A. 8:370 (1901); Broun & Massey, F.S. :416 (1929); Kükenenthal in Engl., Pflanzenr. 4,20:64, fig. 9A–F (1935); Andr., F.P.S. 3:344 (1956); Cuf., Enum. :1425 (1970); Hooper in F.W.T.A. ed. 2, 3:284 (1972).

DARFUR Lowland plain, 600 m; stream banks. *Wickens* 1635.

DISTRIBUTION Mali to Cameroon eastwards to the Somali Republic and south through E. Africa to Zambia and Angola; widespread through the tropics. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

692 ***Cyperus fenzelianus* Steud.**, Syn. Pl. Glum. 2:33 (1855); C. B. Clarke in F.T.A. 8:368 (1901); Broun & Massey, F.S. :415 (1929); Hooper in F.W.T.A. ed. 2, 3:285 (1972).

C. longus L. var. *pallidus* Boeck. in Linnaea 36:280 (1870); Kükenenthal in Engl., Pflanzenr. 4,20:100 (1936); Cuf., Enum. :1429 (1970).

[*C. longus* sensu C. B. Clarke in F.T.A. 8:366 (1901); Andr., F.P.S. 3:345 (1956); Cuf., Enum. :1429 (1970), *non* L. (1753).]

DARFUR Jebel Marra, piedmont, 1160 m; stream bank. *Wickens* 1063.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and Tanzania; also in N. Africa, Arabia and India. Widespread through the Sudan.

FLORISTIC CATEGORY Sudanian and Oriental Domains, Mediterranean and Deccan Regions.

693 ***Cyperus laevigatus* L.**, Mant. 2:179 (1771); Kükenenthal in Engl., Pflanzenr. 4,20:321 (1936); Andr., F.P.S. 3:348 (1956); Hooper in F.W.T.A. ed. 2, 3:293 (1972).

Juncellus laevigatus (L.) C. B. Clarke in Hook. f., Fl. Brit. Ind.

6:596 (1893) & in F.T.A. 8:308 (1901); Broun & Massey, F.S. :408 (1929); Cuf., Enum. :1447 (1970).

Cyperus laevigatus L. var. *distachyos* (All.) Coss. & Dur., Fl. Alger. 11:251 (1854–56); Kükenenthal in Engl., Pflanzenr. 4,20:324 (1936); Wickens, For. Bull. 14(N.S.):40 (1969).

C. laevigatus L. var. *subaphyllus* (Boeck.) Kükenenthal in Wiss. Erg. Schwed. Rhod.-Kongo Exped. 1:2 (1921) & in Engl., Pflanzenr. 4,20:325 (1936); Wickens, For. Bull. 14(N.S.):40 (1969).

synon. nov.

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; lowland plain, 1020 m; saline marshy ground. *Lynes* 407; *Dandy* 198 (BM!); *Jackson* 2603 & 3369; *Robertson* 134; *Wickens* 1076, 1456, 1502, 2886, 2891 & 2964; *Kassas* 565 & 566 (both KHU & CAI, *n.v.*).

DISTRIBUTION Mauritania to N. Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; widespread through the tropics and subtropics of the world. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

NOTE: There are too many intermediates for the varieties to be maintained.

694 ***Cyperus reduncus* Hochst. ex Boeck.** in Linnaea 35:580 (1868); C. B. Clarke in F.T.A. 8:329 (1901); Broun & Massey, F.S. :410 (1929); Kükenenthal in Engl., Pflanzenr. 4,20:240 (1936); Andr., F.P.S. 3:341 (1956); Cuf., Enum. :1435 (1970); Hooper in F.W.T.A. ed. 2, 3:290 (1972).

DARFUR Lowland plain, 1010–1100 m.; flood plain. *Lynes* 623; *Wickens* 2736.

DISTRIBUTION Senegal to the Cameroon eastwards to Ethiopia and Uganda. Widespread through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afrioriental Domains.

695 ***Cyperus rigidifolius* Steud.** in Flora 25:593 (1842); C. B. Clarke in F.T.A. 8:367 (1901); Kükenenthal in Engl., Pflanzenr. 4,20:104 (1936); Wickens, For. Bull. 14(N.S.):41 (1969); Cuf., Enum. :1435 (1970).

DARFUR Jebel Marra, massif, 1850 m; marshy ground. *Lynes* 9; *Wickens* 1433. Vernacular name; (Fur) *weir*; (Arabic) *seid*.

DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to the Transvaal (Map 177).

FLORISTIC CATEGORY Afro-montane.

696 ***Cyperus rotundus* L.**, Sp. Pl. :45 (1753); C. B. Clarke in F.T.A. 8:364 (1901); Broun & Massey, F.S. :415 (1929); Kükenenthal in Engl., Pflanzenr. 4,20:107, fig. 35 (1936); Andr., F.P.S. 3:344 (1956); Quézel, Dossier 5:142 (1969); Cuf., Enum. :1436 (1970); Hooper in F.W.T.A. ed. 2, 3:285 (1972).

DARFUR Lowland plain, 1020–1050 m; arable lands and scree slopes. *Wickens* 1139, 2064 & 2074. A paste made from the tubers is mixed with clarified butter and used as a perfume.

DISTRIBUTION Mauritania eastwards to the Somali Republic and south to the Cape; widespread through the tropics and subtropics. Widespread through the Sudan.

FLORISTIC CATEGORY Pantropical weed.

697 ***Cyperus schimperanus* Steud.**, Syn. Pl. Glum. 2:34 (1855); C. B. Clarke in F.T.A. 8:358 (1901); Broun & Massey, F.S. :414 (1929); Kükenenthal in Engl., Pflanzenr. 4,20:84 (1935); Andr., F.P.S. 3:344 (1956); Cuf., Enum. :1438 (1970).

DARFUR Jebel Marra, massif, 1350–2300 m; stream banks.

Wickens 1260 & 2446; *Kassas* 241, 457, 461, 527, 536, 755 & 869 (all KHU & CAI, *n.v.*).

DISTRIBUTION Cameroon eastwards to the Sudan Republic, Ethiopia and Kenya; also in Egypt. Widespread through the Sudan.

FLORISTIC CATEGORY Sudanian and Afrioriental Domains.

698 **Cyperus** sp. nov.

DARFUR Jebel Marra, massif, 1900–2450 m; marshy ash soils. *Wickens* 2679 & 2986.

699 **Eleocharis** sp. aff. **E. tibestica** Quézel in Bull. Soc. Hist. Nat. Afr. Nord 48:85 (1957) & Univ. Alger Inst. Recherch. Sahar. Mém. No. 4:121, pl. 2A (1958).

DARFUR Jebel Marra, massif (Tereng plateau), 2600 m; marshy stream bank. *Wickens* 2676.

DISTRIBUTION ?Tibesti and Jebel Marra.

Note: The Jebel Marra specimen differs in the slightly longer stigma, 2 mm. long instead of 1 mm. More material is required from both localities in order to determine the range of variation.

700 **Fimbristylis bisumbellata** (Forsk.) Bubani, Dodec. :30 (1850); Andr., F.P.S. 3:360 (1956); Cuf., Enum. :1475 (1970); Napper in F.W.T.A. ed. 2, 3:320 (1972).

Scirpus bisumbellatus Forsk., Fl. Aegypt.-Arab. 1:15 (1775).

[*Fimbristylis dichotoma* sensu C. B. Clarke in F.T.A. 8:414 (1902), pro parte, *non* (L.) Vahl (1805) sensu stricto.]

DARFUR Jebel Marra, piedmont, 1100 m; lowland plain, 790 m; marshy ground. *Jackson* 2547; *Wickens* 993, 1520, 1881 & 2943.

DISTRIBUTION Sudan Republic, Ethiopia and Somali Republic southwards through E. Africa to the Transvaal and SW. Africa; widespread through the tropics and subtropics of the Old World. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

701 **Fimbristylis complanata** (Retz.) Link, Hort. Reg. Bot.

Berol. 1:292 (1827); C. B. Clarke in F.T.A. 8:422 (1902); Andr., F.P.S. 3:362 (1956); Cuf., Enum. :1476 (1970); Napper in F.W.T.A. ed. 2, 3:323 (1972).

Scirpus complanatus Retz., Obs. Bot. 5:14 (1789).

DARFUR Jebel Marra, massif, 1350–2525 m; stream banks and marshy ground. *Steele* 24; *Wickens* 1423 & 1432; *Kassas* 250 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *orang disar* or *weir*; (Arabic) *seid*.

DISTRIBUTION Liberia to Cameroon eastwards to the Sudan Republic (Jebel Marra) and Ethiopia and south through E. Africa to the Cape; widespread through the tropics.

FLORISTIC CATEGORY Pantropical.

702 **Fimbristylis dichotoma** (L.) Vahl, Enum. Pl. 2:287 (1805); C. B. Clarke in F.T.A. 8:414 (1902); Broun & Massey, F.S. :420 (1929); Andr., F.P.S. 3:360 (1956); Cuf., Enum. :1476 (1970);

Napper in F.W.T.A. ed. 2, 3:320 (1972).

Scirpus dichotomus L., Sp. Pl. :50 (1753).

Fimbristylis diphylla (Retz.) Vahl, Enum. Pl. 2:287 (1805); C. B.

Clarke in F.T.A. 8:415 (1902); Broun & Massey, F.S. :420 (1929).

DARFUR Jebel Marra, massif, 1820–1900 m; moist places. *Wickens* 1845 & 2597.

DISTRIBUTION Senegal eastwards to Ethiopia and south to the Cape; widespread through the tropics and subtropics of the world. In the Sudan it is found in the southern provinces.

FLORISTIC CATEGORY Pantropical.

703 **Fimbristylis hispidula** (Vahl) Kunth, Enum. Pl. 2:227 (1837); *Wickens*, For. Bull. 14(N.S.):41 (1969); Quézel, Dossier 5:142 (1969); Cuf., Enum. :1477 (1970); Napper in F.W.T.A. ed. 2, 3:324 (1972).

Scirpus hispidulus Vahl, Enum. Pl. 2:276 (1805).

Fimbristylis exilis (Kunth) Roem. & Schultes, Syst. Veg. 2:98 (1817); C. B. Clarke in F.T.A. 8:418 (1902); Broun & Massey, F.S. :421 (1929); Andr., F.P.S. 3:360 (1956).

DARFUR Lowland plain, 1030–1100 m; dry, stony sites. *Wickens* 2009, 2059 & 2091.

DISTRIBUTION Senegal to Cameroon eastwards to the Sudan Republic (Ethiopia *vide* Cufodontis, *l.c.* but no specimens seen) and south through E. Africa to the Cape; also in America. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region and Neotropical.

704 **Fimbristylis** sp.

DARFUR Jebel Marra, massif, 1900 m; river bank. *Wickens* 2621.

705 **Fuirena pubescens** (Poir.) Kunth, Enum. Pl. 2:182 (1837); C. B. Clarke in F.T.A. 8:463 (1902); Broun & Massey, F.S. :424 (1929); Andr., F.P.S. 3:362 (1956); Cuf., Enum. :1468 (1970).

Carex pubescens Poir., Voy. Barb. :254 (1789).

DARFUR Jebel Marra, massif, 1700–2700 m; marshy places.

Steele 22; *Jackson* 3353; *Wickens* 1700 & 2987.

DISTRIBUTION Southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to the Cape; also in southern Europe and N. Africa.

FLORISTIC CATEGORY Sudano-Zambezian and Mediterranean Regions.

706 **Kyllinga alba** Nees in Linnaea 10:140 (1835); C. B. Clarke in F.T.A. 8:271 (1901); Quézel, Dossier 5:142 (1969); Cuf., Enum. :1459 (1970).

Cyperus cristatus (Kunth) Mattf. & Kükenthal var. *nigritanus* (C. B. Clarke) Kükenthal in Engl., Pflanzenr. 4:20:610 (1936) pro parte; Andr., F.P.S. 3:357 (1956); *Wickens*, For. Bull.

14(N.S.):40 (1969).

DARFUR Lowland plain, 1020 m; savanna. *Wickens* 1801.

DISTRIBUTION Sudan Republic (Darfur) and Ethiopia southwards through E. Africa to the Cape. In the Sudan Andrews, *l.c.*, has recorded this species from the Red Sea Hills but no specimens seen at Kew.

FLORISTIC CATEGORY Sudano-Zambezian Region.

707 **Kyllinga chlorotropis** Steud. in Flora, 25:590 (1842); C. B. Clarke in F.T.A. 8:279 (1901); Cuf., Enum. :1460 (1970).

Cyperus chlorotropis (Steud.) Mattf. & Kükenthal in Engl., Pflanzenr. 4:20:576, fig. 62 (1936).

DARFUR Jebel Marra, massif, 2450–2750 m; upland grassland and fallow lands. *Wickens* 2402, 2410 & 2438.

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia (Map 178).

FLORISTIC CATEGORY Ethiopian-montane.

Kyllinga erecta Schumacher, Beskr. Guin. Pl. :42 (1828); C. B. Clarke in F.T.A. 8:274 (1901), pro parte; Broun & Massey, F.S. :404 (1929); Cuf., Enum. :1461 (1970); Hooper in F.W.T.A. ed. 2, 3:307, fig. 408 (1972).

708 var. **polyphylla** (Willd. ex Kunth) Hooper in Kew Bull.

26:580 (1972) & in F.W.T.A. ed. 2, 3:307 (1972).

K. polyphylla Willd. ex Kunth, Enum. Pl. 2:134 (1837); C. B. Clarke in F.T.A. 8:276 (1901); Broun & Massey, F.S. :405 (1929); Cuf., Enum. :1464 (1970).

Cyperus aromaticus (Ridley) Mattf. & Kükenthal in Engl., Pflanzenr. 4:20:581 (1936); Andr., F.P.S. 3:355 (1956).

DARFUR Jebel Marra, piedmont, 1160 m; aquatic. *Wickens* 2223.

DISTRIBUTION Ghana to Cameroon eastwards to the southern provinces of the Sudan Republic and south into E. Africa; also in Madagascar.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

709 var. **africana** (Kükenthal) Hooper in Kew Bull. 26:580 (1972) & in F.W.T.A. ed. 2, 3:307 (1972).

Cyperus obtusatus (Presl) Mattf. & Kükenthal var. *africanus* Kükenthal in Engl., Pflanzenr. 4:20:586 (1936); Andr., F.P.S. 3:355 (1956); *Wickens*, For. Bull. 14(N.S.):40 (1969).

[*Kyllinga pungens* sensu C. B. Clarke in Dur. & Schinz, Consp. Fl. Afr. 5:532 (1895) & in F.T.A. 8:277 (1901); Broun & Massey, F.S. :405 (1929), *non* Link (1827).]

DARFUR Jebel Marra, piedmont, 1160 m; marshy places. *Wickens* 1878.

DISTRIBUTION Ghana to Cameroon eastwards to the southern provinces of the Sudan Republic.

FLORISTIC CATEGORY Sudanian Domain.

710 **Kyllinga odorata** Vahl, Enum. Pl. 2:382 (1806); C. B. Clarke, Ill. Cyper. t.2, fig. 3–5 (1909); Nelves & Baldwin in Am. Journ. Bot. 39:387 (1952); Cuf., Enum. :1462 (1970); Hooper in F.W.T.A. ed. 2, 3:304 (1972).

K. cylindrica Nees in Wight, Contrib. Bot. Ind. :91 (1834); C. B. Clarke in F.T.A. 8:282 (1901).

Cyperus sesquiflorus (Torrey) Mattf. & Kükenthal in Engl., Pflanzenr. 4,20:591, fig. 6E–J (1936), incl. var. *cylindricus* (Nees) Kükenthal & forma *spindulosus* Kükenthal; Andr., F.P.S. 3:357 (1956); Wickens, For. Bull. 14(N.S.):40 (1969).

DARFUR Jebel Marra, massif, 1525 m; rock crevices. *Wickens* 2129. DISTRIBUTION Sierra Leone to Cameroon eastwards to the southern provinces of the Sudan Republic (Ethiopia *fide* Cufodontis, *l. c.*, but no specimens seen) and south through E. Africa to the Cape; also in Madagascar, tropical Asia and America.

FLORISTIC CATEGORY Pantropical.

711 **Kyllinga pumila** Michaux, Fl. Bor.-Amer. 1:28 (1803); C. B. Clarke in F.T.A. 8:281 (1901); Broun & Massey, F.S. :405 (1929); Nelves & Baldwin in Am. Journ. Bot. 39:387 (1952); Cuf., Enum. :1465 (1970); Hooper in F.W.T.A. ed. 2, 3:305 (1972).

Cyperus tenuifolius (Steud.) Dandy in Exell, Cat. Vasc. S. Tomé :362 (1944); Andr., F.P.S. 3:357 (1956).

DARFUR Jebel Marra, piedmont, 1160 m; arable lands and moist places. *Wickens* 1093 & 1521; *Kassas* 322 (KHU & CAI, *n.v.*). DISTRIBUTION Senegal eastwards to Ethiopia and south to Zambia and Malawi; also in Madagascar and tropical and temperate America. Widespread through the southern provinces of the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

712 **Mariscus alternifolius** Vahl, Enum. Pl. 2:376 (1806), non *Cyperus alternifolius* L.; Hooper in F.W.T.A. ed. 2, 3:296 (1972). *M. umbellatus* (Rottb.) Vahl, *l. c.* (1806); C. B. Clarke in F.T.A. 8:390 (1901); Broun & Massey, F.S. :418 (1929); Cuf., Enum. :1458 (1970), *nom. illegit.*

M. sieberanus Nees in Linnaea 9:286 (1834); C. B. Clarke in F.T.A. 8:288 (1901); Broun & Massey, F.S. :418 (1929); Cuf., Enum. :1456 (1970).

M. sublimis C. B. Clarke in Dur. & Schinz, Consp. Fl. Afr. 5:594 (1895) & in F.T.A. 8:390 (1901).

Cyperus cyperoides (L.) Kuntze, Rev. Gen. Pl. 3; 2:333 (1898); Andr., F.P.S. 3:352 (1956).

DARFUR Jebel Marra, piedmont, 1160 m; gallery forest. *Wickens* 1917.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi, Rhodesia and SW. Africa; also in the Mediterranean area and tropical America. Found in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Mediterranean Regions and Neotropical.

713 **Mariscus psilostachys** C. B. Clarke in Journ. Bot. 34:225 (1896) & in F.T.A. 8:384 (1901).

DARFUR Jebel Marra, foothills, 1160 m; savanna. *Wickens* 2248. DISTRIBUTION Sudan Republic (Darfur) and southwards through E. Africa to Rhodesia.

FLORISTIC CATEGORY Afrioriental and Zambezian Domains.

714 **Mariscus squarrosus** (L.) C. B. Clarke in Hook. f., Fl. Brit. Ind. 6:623 (1893) & in F.T.A. 8:400 (1902); Quézel, Dossier 5:143 (1969); Hooper in F.W.T.A. ed. 2, 3:294 (1972). *Cyperus squarrosus* L., Cent. Pl. 2:6 (1756); Andr., F.P.S. 3:352 (1956).

C. aristatus Rottb., Descr. et Icon. 23, t.6, fig. 1 (1773); C. B. Clarke in F.T.A. 8:348 (1901); Broun & Massey, F.S. :412 (1929).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; arable lands. *Wickens* 2094 & 2263.

DISTRIBUTION Mauritania to Nigeria eastwards to Ethiopia and south through E. Africa to the Cape; widespread in the tropics. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

715 **Pycreus capillifolius** (A. Rich.) C. B. Clarke in Dur. & Schinz, Consp. Fl. Afr. 5:535 (1895) & in F.T.A. 8:300 (1901); Broun & Massey, F.S. :407 (1929); Cuf., Enum. :1440 (1970); Hooper in F.W.T.A. ed. 2, 3:301 (1972).

Cyperus capillifolius A. Rich., Tent. Fl. Abyss. 2:475 (1851); Kükenthal in Engl., Pflanzenr. 4,20:357, fig. 42A–D (1936); Andr., F.P.S. 3:349 (1956).

DARFUR Jebel Marra, massif, 1900 m; marshy ground. *Wickens* 2986.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic, Ethiopia and Uganda, and in Angola; also in Madagascar and Brazil.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

716 **Pycreus elegantulus** (Steud.) C. B. Clarke in Dur. & Schinz, Consp. Fl. Afr. 5:536 (1895) & in F.T.A. 8:302 (1901); Broun & Massey, F.S. :407 (1929); Hooper in F.W.T.A. ed. 2, 3:300 (1972). *Cyperus elegantulus* Steud. in Flora 25:583 (1842); Kükenthal in Engl., Pflanzenr. 4,20:342 (1936); Andr., F.P.S. 3:350 (1956). [*C. cimicinus* sensu Wickens, For. Bull. 14(N.S.):41 (1969), *non* Presl (1828).]

DARFUR Jebel Marra, massif, 1900–2600 m; marshy ground.

Wickens 1701, 2594 & 2673.

DISTRIBUTION N. Nigeria and Cameroon eastwards to Ethiopia and south through E. Africa to Natal and Transvaal. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

717 **Pycreus flavescens** (L.) Reichenb., Fl. Germ. Excurs. :72 (1830); C. B. Clarke in F.T.A. 8:290 (1901); Broun & Massey, F.S. :406 (1929); Cuf., Enum. :1441 (1970); Hooper in F.W.T.A. ed. 2, 3:302 (1972).

Cyperus flavescens L., Sp. Pl. :46 (1853); Kükenthal in Engl., Pflanzenr. 4,20:398 (1936); Andr., F.P.S. 3:351 (1956).

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; moist sites. *Wickens* 1087, 1387, 1874, 1896 & 2617; *Kassas* 348 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *nongzarh*.

DISTRIBUTION Senegal eastwards to Ethiopia and south to Angola and Natal; widely distributed through the warm temperate and tropical regions of the world. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

718 **Pycreus lanceolatus** (Poir.) C. B. Clarke in Dur. & Schinz, Consp. Fl. Afr. 5:538 (1895) *pro parte*; Hooper in F.W.T.A. ed. 2, 3:300 (1972).

Cyperus lanceolatus Poir. in Lam., Encycl. Méth. Bot. 7:245 (1806); Kükenthal in Engl., Pflanzenr. 4,20:349 (1936); Andr., F.P.S. 3:348 (1956).

Pycreus propinquus Nees in Mart., Fl. Bras. 2,1:7 (1842); C. B. Clarke in F.T.A. 8:300 (1901); Broun & Massey, F.S. :406 (1929). DARFUR Jebel Marra, piedmont, 1160 m; marshy ground. *Wickens* 2174.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Angola; also in Madagascar and tropical and subtropical America. Recorded from the southern provinces of the Sudan by Andrews, *l. c.*, but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions and Neotropical.

719 **Pycreus macrostachyos** (Lam.) J. Raynal in Kew Bull. 23:314 (1969); Cuf., Enum. :1442 (1970); Hooper in F.W.T.A. ed. 2, 3:301 (1972).

Cyperus macrostachyos Lam., Ill. Gen. 1:147 (1791); Kükenthal in Engl., Pflanzenr. 4,20:627 (1936).

Pycrus albomarginatus Nees in Mart., Fl. Bras. 2:19 (1842); C. B. Clarke in F.T.A. 8:305 (1901); Broun & Massey, F.S. :407 (1929).

Cyperus albomarginatus (Nees) Steud., Syn. Pl. Glum. 2:10 (1854); Kükenthal in Engl., Pflanzenr. 4,20:359, fig. 42E–H (1936). [*C. tremulus* sensu Andr., F.P.S. 3:350 (1956), *non* Poir. (1806).] var. **macrostachyos**.

Cyperus albomarginatus (Nees) Steud. var. *albomarginatus*; Wickens, For. Bull. 14(N.S.) :40 (1969).

DARFUR Lowland plain, 1020 m; river bank. *Wickens* 2499.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia; also in Madagascar, India, Burma, Australia and America. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

720 var. **tenuis** (Boeck.) *Wickens comb. nov.*

Cyperus hochstetteri Krauss var. *tenuis* Boeck. in Flora 62:546 (1879). *C. albomarginatus* (Nees) Steud. var. *tenuis* (Boeck.) Kükenthal in Engl., Pflanzenr. 4,20:361 (1936); Wickens, For. Bull. 14(N.S.) :40 (1969).

DARFUR Lowland plain, 1020 m; alluvial flood plain. *Wickens* 2076.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic; also in Tanzania and Natal.

FLORISTIC CATEGORY Sudanian Domain with Zambezan extensions.

721 **Pycrus mundtii** Nees in Linnaea 9:283 (1834) & 10:131 (1936); C. B. Clarke in F.T.A. 8:294 (1901); Broun & Massey, F.S. :406 (1929); Cuf., Enum. :1443 (1970); Hooper in F.W.T.A. ed. 2, 3:302 (1972).

Cyperus mundtii (Nees) Kunth, Enum. Pl. 2:17 (1837); Kükenthal in Engl., Pflanzenr. 4,20:380 (1936); Andr., F.P.S. 3:348 (1956). DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; stream banks. *Lynes* 78; *Dandy* 132 (BM!); *Jackson* 3296; *Wickens* 1007, 1281 & 2966; *Kassas* 608 (KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic and Ethiopia south through E. Africa to the Cape; also in Madagascar and the Mediterranean area (Map 179). Widely distributed in the Sudan along the Nile and its tributaries.

FLORISTIC CATEGORY Afrioriental and Zambezan Domains, Mediterranean and Madagascan Regions.

722 **Pycrus pumilis** (L.) Nees in Linnaea 9:283 (1834); C. B. Clarke in F.T.A. 8:296 (1901); Cuf., Enum. :1445 (1970); Hooper in F.W.T.A. ed. 2, 3:302 (1972). *Cyperus pumilis* L., Cent. Pl. 2:6 (1756). *C. patens* Vahl, Enum. Pl. 2:334 (1805).

Pycrus nitens Nees in Nov. Act. Cur. 19, Suppl. 1:53 (1843); C. B. Clarke in F.T.A. 8:295 (1901); Broun & Massey, F.S. :406 (1929). *Cyperus pumilus* L. var. *muticus* (Boeck.) C. B. Clarke in Journ.

Linn. Soc. Bot. 21:45 (1884); Andr., F.P.S. 3:349 (1956).

C. pumilus L. var. *patens* (Vahl) Kükenthal in Engl., Pflanzenr. 4,20:378 (1936); Wickens, For. Bull. 14(N.S.) :40 (1969).

DARFUR Lowland plain, 1020 m; arable lands. *Wickens* 2734.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique and the Transvaal; widespread through the tropics. Widespread through the central provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

723 **Pycrus unioloïdes** (R. Br.) Urban, Symb. Antill. 2:164 (1900); Hooper in F.W.T.A. ed. 2, 3:300 (1972).

Cyperus unioloïdes R. Br., Prodr. :216 (1810); Kükenthal in Engl., Pflanzenr. 4,20:338, figs. 2B & 4E–G (1936); Andr., F.P.S. 3:350 (1956).

DARFUR Jebel Marra, piedmont, 1160 m; basalt clay depression. *Wickens* 2257.

DISTRIBUTION Gambia to Nigeria eastwards to Ethiopia and south through E. Africa to the Cape; widespread through the tropics. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Pantropical.

724 **Pycrus** sp. nov. aff. **P. subtrigonus** C. B. Clarke.

DARFUR Jebel Marra, massif, 1340 m; arable lands. *Wickens* 2858.

Densely tufted sedge; achenes triangular with *Pycrus flavescens* markings, 2 stigma, 3 stamens and short anthers.

725 **Scirpus articulatus** L., Sp. Pl. :47 (1753); C. B. Clarke in F.T.A. 8:453 (1902); Broun & Massey, F.S. :423 (1929); Andr., F.P.S. 3:367 (1956); Cuf., Enum. :1468 (1970); Hooper in F.W.T.A. ed. 2, 3:310 (1972).

DARFUR Lowland plain, 1020 m; shallow silty depressions. *Wickens* 1135.

DISTRIBUTION Ghana to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; also in Madagascar and tropical Asia. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

726 **Scirpus brachyceras** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:496 (1851); Andr., F.P.S. 3:368 (1956); Hooper in F.W.T.A. ed. 2, 3:311 (1972).

S. corymbosus (Heyne) Heyne ex Roth, Nov. Pl. Sp. :28 (1821);

C. B. Clarke in F.T.A. 8:455 (1902); Norman in Journ. Bot.

62:135 (1924); Broun & Massey, F.S. :423 (1929), *non* L. (1759).

DARFUR Jebel Marra, massif, 2300–2700 m; marshy ground.

Lynes 174; *Jackson* 3374; *Wickens* 1244, 2674; *Abdel Gadir & Pettet* in *Kassas* 724 (KHU & CAI, *n.v.*).

DISTRIBUTION Mali to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and SW. Africa; also in Madagascar. In the Sudan it is known from Jebel Marra and the Didinga Hills.

FLORISTIC CATEGORY Sudano-Zambezan and Madagascan Regions.

727 **Scirpus microcephalus** (Steud.) Dandy ex F. W. Andr., F.P.S. 3:366 (1956); Cuf., Enum. :1472 (1970); Hooper in F.W.T.A. ed. 2, 3:311 (1972).

Kyllinga microcephala Steud. in Flora 25:597 (1842).

Scirpus kyllingioides (A. Rich.) Boeck. in Linnaea 36:753 (1870);

C. B. Clarke in F.T.A. 8:457 (1902); Broun & Massey, F.S. :424 (1929).

[*Cyperus leucocephalus* sensu Broun & Massey, F.S. :408 (1929), *non* Retz. (1788).]

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1060–1100 m; rocky places. *Lynes* 624; *Wickens* 1773 & 1855.

DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic and south through E. Africa to Mozambique and Rhodesia; also in India.

FLORISTIC CATEGORY Sudano-Zambezan and Deccan Regions.

Gramineae

728 **Agrostis lachnantha** Nees in Linnaea 10, Litt. :115 (1836); Hubbard in F.T.A. 10:172 (1937); Andr., F.P.S. 3:387 (1956); Cuf., Enum. :1228 (1968); Clayton, F.T.E.A. Gramin. :106 (1970).

DARFUR Jebel Marra, massif, 1340–2700 m; moist places. *Steele* 17; *Jackson* 2602, 2616 & 3349; *Blair* 26, 226, 244, 282 & 300; *Wickens* 1189 & 1250; *Kassas* s.n. (KHU & CAI, *n.v.*).

DISTRIBUTION Uplands of Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to the Cape (Map 180).

FLORISTIC CATEGORY Afro-montane.

729 **Aira caryophyllea** L., Sp. Pl. :66 (1753); Hubbard in F.T.A. 10:87 (1937); Clayton, F.T.E.A. Gramin. :84, fig. 29 (1970) & in F.W.T.A. ed. 2, 3:372 (1972).

A. caryophyllea L. var. *latigluma* (Steud.) C. E. Hubbard in F.T.A. 10:88 (1937); Andr., F.P.S. 3:387 (1956); Wickens, For. Bull. 14(N.S.) :41 (1969).

DARFUR Jebel Marra, massif (Jebel Uwo), 3070 m; *Jackson* 3337.

DISTRIBUTION Uplands of N. Nigeria, Cameroon, Sudan Republic (Jebel Marra and the Red Sea Hills) and Ethiopia southwards to the Cape; also in northern Europe and Asia (Map 181).

FLORISTIC CATEGORY Afro-montane and Palearctic.

Note: De Miré & Quézel in Journ. Agric. Trop. et Bot. Appl. 8:111 (1961) refer the Jebel Marra specimens to *A. cupaniana* Guss. (1842), a Mediterranean species. In Europe and the Middle East the two species may be separated according to the following characters:

<i>A. caryophyllea</i>	<i>A. cupaniana</i>
Pedicel tip pear-shaped	expanded into an annular cushion
Spikelet length c. 2.5 mm	c. 2 mm
Lemma/glume ratio 3:4	5:7
Glume apex acute	apex obtuse
Callus bearded	glabrous

Clayton, *l. c.*, notes that in Africa the two species intergrade and are consequently difficult to separate, with specimens from Ethiopia, E. Africa and South Africa approaching *A. cupaniana*, while those from Cameroon and Malawi more closely resemble *A. caryophyllea*. The Jebel Marra specimens certainly approach *A. cupaniana* but are not identical to that species. In view of the uncertainty as to the exact status of the two species, the older name is being used.

730 **Alloteropsis cimicina** (Retz.) Stapf in F.T.A. 9:487 (1919); Andr., F.P.S. 3:388 (1956).

Panicum cimicinum Retz., Obs. Bot. 3:9 (1783).

DARFUR Jebel Marra, piedmont and foothills, 1130–1160 m; lowland plain, 900–1130 m; savanna. Blair 135, 323a & 348; Wickens 2038, 2052, 2246 & 2309.

DISTRIBUTION N. Nigeria and the central and southern provinces of the Sudan Republic southwards through E. Africa to Natal and SW. Africa; also in Madagascar and India.

FLORISTIC CATEGORY Sudano-Zambezian, Madagascan and Deccan Regions.

731 **Andropogon distachyos** L., Sp. Pl. :1046 (1753); Stapf in F.T.A. 9:218 (1919); Andr., F.P.S. 3:388 (1956); Quézel, Dossier 5:134 (1969); Cuf., Enum. :1396 (1970); Clayton in F.W.T.A. ed. 2, 3:485 (1972).

DARFUR Jebel Marra, massif, 1900–3070 m; upland grassland. Steele 13 & 20; Dandy 89, 94 & 109 (all BM!); Robertson 154; Blair 192, 236, 287, 288, 296, 310, 353, 358, 369, 377 & 384; Wickens 1231, 2464, 2473, 2482, 2485, 2488, 2599 & 2694; Kassas 481a, 518 & 700 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *kinyang kira*; (Arabic) *merrisat tuwerat*.

DISTRIBUTION Cameroon Mtn., Sudan Republic (Jebel Marra and Jebel Gurgeil), Ethiopia and south through E. Africa to Rhodesia (Inyanga); also in North Africa from Morocco to Egypt and across to Arabia and southern Europe (Map 182).

FLORISTIC CATEGORY Afro-montane and Mediterranean Regions.

732 **Andropogon fastigiatus** Swartz, Prodr. Veg. Ind. Occ. :26 (1788); Wickens, For. Bull. 14(N.S.) :41 (1969); Clayton in F.W.T.A. ed. 2, 3:485 (1972).

Diectomis fastigata (Swartz) Kunth in Humb., Bonpl. & Kunth, Nov. Gen. et Sp. 1:193, t.64 (1816); Stapf in F.T.A. 9:207 (1919); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :448 (1929); Andr., F.P.S. 3:431 (1956); Quézel, Dossier 5:137 (1969); Cuf., Enum. :1399 (1970).

DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; lowland plain 1050 m; rock crevices and upland grassland. Lynes 185 (BM!); Blair 159; Wickens 2758 & 2792.

DISTRIBUTION Guinée Republic to Cameroon eastwards through the Central African Republic to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Botswana; also from Morocco to Egypt and in SE. Asia and America. Widespread through the central provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

Andropogon gayanus Kunth, Enum. Pl. :1491 (1833); Stapf in F.T.A. 9:261 (1919); Andr., F.P.S. 3:389 (1956); Cuf., Enum. :1397 (1970); Clayton in F.W.T.A. ed. 2, 3:488 (1972). *A. gayanus* Kunth. var. *genuinus* Hack. in DC., Monogr. Phan. 6:488 (1889); Stapf in F.T.A. 9:262 (1919); Broun & Massey, F.S. :449 (1929).

733 var. **squamulatus** (Hochst.) Stapf in F.T.A. 9:263 (1919); Broun & Massey, F.S. :449 (1929); Andr., F.P.S. 3:391 (1956); Cuf., Enum. :1397 (1970); Clayton in F.W.T.A. ed. 2, 3:489 (1972).

A. squamulatus Hochst. in Flora 27:244 (1844).

A. cordofanus Hochst. in *op. cit.* :245 (1844).

DARFUR Jebel Marra, piedmont and massif, 1090–2450 m; lowland plain, 1050–1100 m; fallow lands, savanna and upland grassland. Lynes 187 (BM!), 527 & 626; Steele 40; Jackson 3309; Pettet J2 & J31; Blair 60, 184, 189, 203, 256 & 257; Wickens 983, 1099, 1182, 1390, 1473, 1875, 1938, 2569, 2573, 2682 & 2762; Kassas 426 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *boroh*; (Arabic) *marhabeib*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa.

Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

734 var. **tridentatus** (Hochst.) Hack. in DC., Monogr. Phan. 6:449 (1889); Wickens, For. Bull. 14(N.S.) :41 (1969); Clayton in F.W.T.A. ed. 2, 3:488 (1972).

A. tridentatus Hochst. in Flora 27:246 (1844), *nomon. illegit., non* Roxb. (1820).

DARFUR Jebel Marra, massif, 1500 m; lowland plain, 1020 m; forestry plantation and savanna. Blair 67; Wickens 2801.

DISTRIBUTION Senegal to Nigeria eastwards to the central provinces of the Sudan Republic.

FLORISTIC CATEGORY Sudanian Domain.

735 **Andropogon longipes** Hackel in Flora 68:138 (1885); Bor, Grasses Burma, Ceylon, India & Pakistan :91 (1960).

A. pratensis Hochst. ex Hackel in DC., Monogr. Phan. 6:463 (1889); Stapf in F.T.A. 9:219 (1919); Cuf., Enum. :1399 (1970); Clayton in F.W.T.A. ed. 2, 3:485 (1972).

A. pilosellus Stapf in F.T.A. 9:221 (1919); Cuf., Enum. :1398 (1970).

DARFUR Jebel Marra, massif, 2400 m; upland grassland; Wickens 1705.

DISTRIBUTION Fernando Po, Nigeria (Plateau), Cameroon, Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to Zambia (Map 183), also India (Nilgiri Hills), probably introduced.

FLORISTIC CATEGORY Afro-montane.

736 **Andropogon schirensis** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:456 (1851); Stapf in F.T.A. 9:246 (1919); Broun & Massey, F.S. :449 (1929); Andr., F.P.S. 3:389, fig. 94 (1956); Cuf., Enum. :1399 (1970); Clayton in F.W.T.A. ed. 2, 3:486, fig. 459 (1972).

DARFUR Jebel Marra, massif, 1340 m; alluvial soils. Blair 183.

DISTRIBUTION Sierra Leone to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW Africa. In the Sudan it is present in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian Region.

737 **Antheophora hochstetteri** Nees in Flora 27:249 (1844); Broun & Massey, F.S. :467 (1929); Stapf & Hubbard in F.T.A. 9:944 (1930); Andr., F.P.S. 3:392 (1956); Cuf., Enum. :1360 (1969); Quézel, Dossier 5:134 (1969); Clayton in F.W.T.A. ed. 2, 3:457 (1972).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain 1020 m; arable lands and scree slopes. *Blair* 5, 344 & 345; *Wickens* 1921 & 2080. Vernacular name: (Arabic) *tahi*.

DISTRIBUTION Mali (Adrar des Ifora), central provinces of Sudan Republic, Ethiopia, Somali Republic, Uganda and Kenya.

FLORISTIC CATEGORY Sahelian and Afriental Domains.

738 *Anthephora lynesii* Stapf & Hubbard in F.T.A. 9:938 (1930); Andr., F.P.S. 3:391 (1956).

[*A. elegans* sensu Broun & Massey, F.S. :467 (1929), non Schreb. (1810).]

DARFUR Jebel Marra, piedmont and massif, 1160–1340 m; lowland plain, 1020–1100 m; fallow lands and savanna. *Lynes* 627 (K, holotype!); *Blair* 24; *Wickens* 1100, 1564 & 2053.

DISTRIBUTION Sudan Republic (doubtfully distinct from *A. hochstetteri*). Only known from Darfur and Kordofan provinces.

FLORISTIC CATEGORY Eastern Sahelian Domain.

739 *Anthephora* sp. aff. *nigritana* Stapf & Hubbard in F.T.A. 9:937 (1930).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Robertson* 19.

DISTRIBUTION (of *A. nigritana*) Ghana and N. Nigeria.

Note: The Darfur specimen is intermediate between *A. nigritana* and *A. lynesii*, having the long ciliate lemma of the former and the long ligule of the latter species. A similar specimen has been collected from Kassala Province.

740 *Aristida adöensis* Hochst. in sched., Schimp. Iter. Abyss. 3, No. 1806 (1844); Cuf., Enum. :1293 (1969); Quézel, Dossier 5:135 (1969); Clayton, F.T.E.A. Gramin. :144 (1970).

DARFUR Jebel Marra, massif, c. 2300–2700 m; upland grassland.

Jackson 3376; *Kassas* 542b (KHU & CAI, n.v.).

DISTRIBUTION Sudan Republic Jebel Marra and Didinga Hills, Ethiopia, Uganda, Kenya and Tanzania.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

741 *Aristida adscensionis* L., Sp. Pl. :82 (1753); Broun & Massey, F.S. :471 (1929); Andr., F.P.S. 3:395, fig. 95 (1956); Cuf., Enum. :1294 (1969); Wickens, For. Bull. 14(N.S.) :41 (1969); Quézel, Dossier 5:135 (1969); Clayton, F.T.E.A. Gramin. :148 (1970) & in F.W.T.A. ed. 2, 3:379 fig. 427 (1972). *A. submucronata* Schumacher, Beskr. Guin. Pl. :47 (1827); Andr., F.P.S. 3:395 (1956).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1020 m; fallow lands and savanna. *Jackson* 3311; *Blair* 13 & 123; *Wickens* 1476, 1477, 1565, 1662, 1993, 2217, 2343, 2532, 2560 & 2799. Vernacular name: (Fur) *beeli*; (Arabic) *humra*.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Transvaal, and SW. Africa; widespread through the warm temperature and tropical regions of the world. Widely distributed through the Sudan.

FLORISTIC CATEGORY Pantropical.

742 *Aristida caerulea* Desf., Fl. Atlant. 1:109, t.21, fig. 2 (1793); Bor, Fl. Iraq 9:384, fig. 146 (1968); Clayton in F.W.T.A. ed. 2, 3:381 (1972).

DARFUR Jebel Marra, massif, 2450 m; upland grassland. *Blair* 309 & 373; *Wickens* 2440.

DISTRIBUTION Niger (Air), Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia and Somali Republic; also southern Europe, North Africa, Middle East and Arabia across to Afghanistan (Map 184).

FLORISTIC CATEGORY Sahelian and Afriental Domains, Saharo-Sindian, Mediterranean and Irano-Turanian Regions.

743 *Aristida congesta* Roem. & Schultes, Syst. Veg. 2:401 (1817); Clayton, F.T.E.A. Gramin. :156 (1979).

DARFUR Jebel Marra, massif, 1900–2800 m; upland meadow and arable lands. *Lynes* 182; *Jackson* 3355 & 4066; *Blair* 232, 351 & 375; *Wickens* 1245, 2430, 2440, 2486 & 2639. Vernacular name: (Fur) *dee ankar*.

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia southwards to the Cape.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

744 *Aristida cumingiana* Trin. & Rupr., Sp. Gram. Stip. :141 (1842); Broun & Massey, F.S. :471 (1929); Andr., F.P.S. 3:393 (1956); Cuf., Enum. :1295 (1969); Clayton, F.T.E.A. Gramin. :146 (1970) & in F.W.T.A. ed. 2, 3:379 (1972). DARFUR Jebel Marra, massif, 2000 m; upland meadow. *Blair* 195. DISTRIBUTION Scattered occurrences from Guinée Republic, Cameroon, southern provinces of the Sudan Republic, Ethiopia and from Tanzania southwards to Rhodesia; also in southern Asia.

FLORISTIC CATEGORY Palaeotropical.

745 *Aristida funiculata* Trin. & Rupr., Sp. Gram. Stip. :159 (1842); Broun & Massey, F.S. :472 (1929); Andr., F.P.S. 3:396 (1956); Cuf., Enum. :1295 (1969); Quézel, Dossier 5:135 (1969); Clayton, F.T.E.A. Gramin. :152 (1970) & in F.W.T.A. ed. 2, 3:379 (1972).

DARFUR Jebel Marra, piedmont, 1100 m; savanna. *Wickens* 2567.

DISTRIBUTION Senegal and Mali eastwards to Ethiopia, Somali Republic and Kenya; also in Egypt, Arabia and India. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sahelian Domain, Saharo-Sindian and Deccan Regions.

746 *Aristida hordeacea* Kunth. Rév. Gram. :517, t.173 (1830); Andr., F.P.S. 3:395 (1956); Cuf., Enum. :1296 (1969); Quézel, Dossier 5:135 (1969); Clayton, F.T.E.A. Gramin. :150, fig. 48 (1970) & in F.W.T.A. ed. 2, 3:379 (1972).

A. steudeliana Trin. & Rupr., Sp. Gram. Stip. :155 (1842); Broun & Massey, F.S. :471 (1929).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020–1030 m; *Acacia seyal* savanna. *Blair* 141 & 223; *Wickens* 2341 & 2730.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and SW. Africa. Widely distributed in the Sudan.

FLORISTIC CATEGORY Sudano-Zambeian Region.

747 *Arthraxon lancifolius* (Trin.) Hochst. in Flora 39:188 (1856); Stapf in F.T.A. 9:165 (1917); Andr., F.P.S. 3:399 (1956); Clayton in F.W.T.A. ed. 2, 3:470 (1972).

Andropogon lancifolius Trin. in Mém. Acad. Sci. Pétersb. VI, 2:271 (1832).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1050 m; moist sites. *Wickens* 1666 & 2320.

DISTRIBUTION Sierra Leone to Cameroon eastwards to Ethiopia and south through Tanzania to Zambia and Mozambique; also in tropical Asia. In the Sudan it is said to occur in Kordofan province *vide* Andrews, l. c. but no specimens seen.

FLORISTIC CATEGORY Palaeotropical.

748 *Arthraxon quartianianus* (A. Rich.) Nash in N. Amer. Flora 17:99 (1912); Stapf in F.T.A. 9:166 (1917); Andr., F.P.S. 3:399 (1956); Clayton in F.W.T.A. ed. 2, 3:470 (1972).

Alectoridia quartianiana A. Rich., Tent. Fl. Abyss. 2:448 (1851).

DARFUR Jebel Marra, massif, 1525–2000 m; lowland plain, 1020 m; moist sites. *Pellet* J. 35; *Blair* 186; *Wickens* 1447, 2592 & 2744.

DISTRIBUTION Sierra Leone to Cameroon eastwards to the Sudan Republic (Jebel Marra, Red Sea Hills and the Imatongs), Ethiopia and south through E. Africa to Malawi, Rhodesia and Angola; also in SE. Asia and the Americas.

FLORISTIC CATEGORY Pantropical.

749 *Arundinella pumila* (Hochst. ex A. Rich.) Steud., Syn. Pl. Glum. 1:114 (1854); Hubbard in F.T.A. 10:3 (1937); Cuf., Enum. :1238 (1968); Wickens, For. Bull. 14(N.S.) :42 (1969); Clayton in F.W.T.A. ed. 2, 3:414 (1972).

Acratherum pumilum Hochst. ex A. Rich., Tent. Fl. Abyss. 2:414 (1851).

DARFUR Jebel Marra, piedmont and massif, 1160–1370 m; moist and shaded basalt rock crevices. *Blair* 214; *Wickens* 2506.

DISTRIBUTION Sierra Leone to Cameroon eastwards to the Sudan Republic (Jebel Marra) and Ethiopia; also in SE. Asia and Australia.

FLORISTIC CATEGORY Palaeotropical.

750 **Beckeropsis nubica** (Hochst.) Fig. & De Not. in Mém. Accad. Sci. Torino, II, 14:368 (1854); Stapf & Hubbard in F.T.A. 9:952 (1934); Andr., F.P.S. 3:401 (1956); Cuf., Enum. :1353 (1969).

Gymnothrix nubica Hochst. in Flora 27:251 (1844).

[*Pennisetum unisetum* sensu Norman in Journ. Bot. 62:135 (1924);

Broun & Massey, F.S. :468 (1929), pro parte, *non* Benth. (1881).]

DARFUR Jebel Marra, massif, 2800 m; lowland plain, 1050 m; rock crevices. *Lynes* 184; *Wickens* 2757.

DISTRIBUTION Central provinces of the Sudan Republic and Ethiopia.

FLORISTIC CATEGORY Eastern Sudanian and Afriental Domains.

751 **Beckeropsis uniseta** (Nees) K. Schum. in Engl., Pflanzenw. Ost-Afr. B:52 (1895); Stapf & Hubbard in F.T.A. 9:949 (1934); Andr., F.P.S. 3:401 (1956); Cuf., Enum. :1354 (1969); Clayton in F.W.T.A. ed. 2, 3:459 (1972).

Gymnothrix uniseta Nees, Fl. Afr. Austr. :66 (1841).

DARFUR Jebel Marra, piedmont and massif, 1160–2800 m;

savanna arable lands and upland grassland. *Lynes* 184 (BM!);

Dandy 186 (BM!); *Jackson* 3307; *Pettet* J.17; *Blair* 178 & 246;

Wickens 2782 & 2785; *Kassas* 178, 461:23, 461:28, 540 & 604 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *korrla*.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal and the Transvaal. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

752 **Bothriochloa insculpta** (Hochst. ex A. Rich.) A. Camus in Ann. Soc. Linn. Lyon n.s. 76:165 (1931); Andr., F.P.S. 3:402 (1956); Cuf. Enum. :1389 (1970).

Andropogon insculptus Hochst. ex A. Rich., Tent. Fl. Abyss. 2:488 (1851).

Amphilophis insculpta (Hochst. ex A. Rich.) Stapf in F.T.A. 9:176 (1917).

[*Bothriochloa intermedia* Stapf var. *acidula* sensu Wickens, For. Bull. 14(N.S.) :42 (1969), *non* (Roxb.) Camus (1931).]

DARFUR Jebel Marra, piedmont and massif, 1130–1780 m; stream banks. *Blair* 1 & 111; *Wickens* 1895, 2243, 2261, 2580 & 2714.

DISTRIBUTION Sudan Republic (Jebel Marra, Red Sea Hills and southern provinces) and Ethiopia southwards through E. Africa to Natal; also in India.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

753 **Brachiaria brizantha** (Hochst. ex A. Rich.) Stapf in F.T.A. 9:531 (1919); Broun & Massey, F.S. :456 (1929); Andr., F.P.S. 3:407 (1956); Cuf., Enum. :1312 (1969); Clayton in F.W.T.A. ed. 2, 3:443, fig. 442 (1972).

Panicum brizanthum Hochst. ex A. Rich., Tent. Fl. Abyss. 2:363 (1851).

DARFUR Jebel Marra, piedmont and massif, 1160–1850 m; stony soils. *Blair* 101 & 121; *Wickens* 2184 & 2208.

DISTRIBUTION Ivory Coast to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; introduced into India, Malaya, Australia and S. America. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian Region.

754 **Brachiaria deflexa** (Schumach.) C. E. Hubbard ex Robyns in Bull. Jard. Bot. Brux. 9:181 (1932); Andr., F.P.S. 3:410 (1956); Cuf., Enum. :1313 (1969); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:444 (1972).

Panicum deflexum Schumach., Beskr. Guin. Pl. :63 (1827).

Brachiaria regularis (Nees) Stapf in F.T.A. 9:544 (1919); Broun & Massey, F.S. :456 (1929).

DARFUR Jebel Marra, massif, 1340 m; lowland plain, 1020–1100 m; moist sites. *Lynes* 630; *Blair* 30; *Wickens* 2073 & 2083.

DISTRIBUTION Gambia to Nigeria eastwards to the Somali Republic and south through E. Africa to Natal, Transvaal and SW. Africa; also in Madagascar, Arabia and India. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian, Madagascan and Saharo-Sindian Regions.

755 **Brachiaria humidicola** (Rendle) Schweick. in Bull. Misc. Inf. Kew 1936:297 (1936); Wickens, For. Bull. 14(N.S.) :42 (1969); Clayton in F.W.T.A. ed. 2, 3:443 (1972).

Panicum humidicolum Rendle, Cat. Welw. Afr. Pl. 2:169 (1899).

DARFUR Jebel Marra, piedmont and massif, 1160–c. 1500 m; stream banks and marshy places. *Blair* 187 & 339; *Wickens* 2259.

DISTRIBUTION N. Nigeria (Plateau), Sudan Republic (Jebel Marra) and Tanzania southwards to Natal, Transvaal and SW. Africa.

FLORISTIC CATEGORY Zambezian Domain with Sudanian extensions.

756 **Brachiaria jubata** (Fig. & DeNot.) Stapf in F.T.A. 9:563 (1919); Broun & Massey, F.S. :457 (1929); Andr., F.P.S. 3:406 (1956); Cuf., Enum. :1314 (1969); Clayton in F.W.T.A. ed. 2, 3:443 (1972).

Panicum jubatum Fig. & DeNot. in Mém. Acad. Sci. Torino II, 14:331, t.9 (1854).

Brachiaria fulva Stapf in F.T.A. 9:518 (1919); Broun & Massey, F.S. :455 (1929).

B. brevis Stapf in F.T.A. 9:519 (1919).

[*B. serrata* sensu Wickens, For. Bull. 14(N.S.) :42 (1969), *non* Stapf (1919).]

DARFUR Jebel Marra, piedmont and massif, 1160–2150 m; wayside, arable lands and upland grassland. *Pettet* J.34; *Blair* 71 & 106; *Wickens* 1847, 1888, 2168, 2584 & 2699.

DISTRIBUTION Gambia to Cameroon eastwards to Ethiopia, Uganda, and Kenya, also in Angola. Found in the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

757 **Brachiaria kotschyana** (Hochst. ex Steud.) Stapf in F.T.A. 9:560 (1919); Broun & Massey, F.S. :457 (1929); Andr., F.P.S. 3:411, fig. 97 (1956); Cuf., Enum. :1314 (1969); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:444 (1972).

Panicum kotschyianum Hochst. ex Steud., Syn. Pl. Glum. 1:68 (1854).

[*Brachiaria ukambensis* sensu Wickens, For. Bull. 14(N.S.) :42 (1969), *non* Henrard (1940).]

DARFUR Jebel Marra, piedmont, 1160 m; arable lands. *Blair* 125.

DISTRIBUTION Senegal, Nigeria and Cameroon eastwards to Ethiopia and south into Uganda, Tanzania and Angola. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

758 **Brachiaria lata** (Schumach.) C. E. Hubbard in Hook., Icones Pl. 1938, sub.t. 3363 (1938) in adnot; Andr., F.P.S. 3:408 (1956); Cuf., Enum. :1314 (1969); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:444 (1972).

Panicum latum Schumach., Beskr. Guin. Pl. :61 (1827).

Urochloa insculpta (Steud.) Stapf in F.T.A. 9:599 (1920); Broun & Massey, F.S. :459 (1929).

DARFUR Lowland plain, 700–1020 m; flood plain. *Blair* 314 & 326; *Wickens* 1996, 2014, 2041 & 2071.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia; also in the Yemen. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian, Afriental and South Arabian Domains.

759 **Brachiaria ramosa** (L.) Stapf in F.T.A. 9:542 (1919); Andr., F.P.S. 3:409 (1956); Cuf., Enum. :1316 (1969); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:444 (1972). *Panicum ramosum* L., Mant. Pl. 1:29 (1767). DARFUR Lowland plain, 1130 m; *Acacia seyal* savanna. Blair 132. DISTRIBUTION Mauritania to N. Nigeria eastwards to Ethiopia and south through Kenya and Tanzania to Malawi and Zambia; widespread in the tropics of the Old World. In the Sudan it is widespread in the northern and central provinces. FLORISTIC CATEGORY Palaeotropical.

760 **Brachiaria secernenda** (Hochst. ex Mez) Henrard in Blumea 3:432 (1940); Andr., F.P.S. 3:411 (1956); Cuf., Enum. :1317 (1969). *Panicum secernendum* Hochst. ex Mez in Not. Bot. Gart. Berlin 7:68 (1917). *Brachiaria epaleata* Stapf in F.T.A. 9:555 (1919); Broun & Massey, F.S. :457 (1929). DARFUR Jebel Marra, piedmont, 1160 m; fallow lands. Wickens 2110. DISTRIBUTION Central provinces of the Sudan Republic and Ethiopia. FLORISTIC CATEGORY Afriental Domain with an Eastern Sahelian extension.

761 **Brachiaria semiundulata** (A. Rich.) Stapf in F.T.A. 9:556 (1919); Cuf., Enum. :1317 (1969). *Panicum semiundulatum* A. Rich., Tent. Fl. Abyss. 2:364 (1851). DARFUR Jebel Marra, massif, 1500–2290 m; gallery forest and fallow lands. Blair 385; Wickens 2158. DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Uganda, Kenya and Tanzania; also in India. FLORISTIC CATEGORY Afriental and Zambeian Domains and Deccan Region.

762 **Brachiaria serrifolia** (Hochst.) Stapf in F.T.A. 9:548 (1919); Andr., F.P.S. 3:410 (1956); Cuf., Enum. :1318 (1969); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:444 (1972). *Panicum serrifolium* Hochst. in Flora 38:196 (1855). DARFUR Jebel Marra, piedmont, 1310 m; lowland plain, 1130 m; savanna. Blair 131 & 152. DISTRIBUTION Niger Republic eastwards to Ethiopia and south through E. Africa to Rhodesia and Angola. An uncommon grass of the central and southern provinces of the Sudan. FLORISTIC CATEGORY Sudano-Zambeian Region.

763 **Brachiaria xantholeuca** (Hackel ex Schinz) Stapf in F.T.A. 9:541 (1919); Andr., F.P.S. 3:409 (1956); Cuf., Enum. :1319 (1969); Clayton in F.W.T.A. ed. 2, 3:444 (1972). *Panicum xantholeucum* Hackel ex Schinz in Verh. Bot. Ver. Brand. 30:141 (1889). DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020–1030 m; savanna and marshy places. Wickens 2069, 2274 & 2312. DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic and Uganda, also Mozambique, Zambia, Rhodesia, Natal, Transvaal and SW. Africa. FLORISTIC CATEGORY Sudano-Zambeian Region.

764 **Brachypodium sylvaticum** (Hudson) P. Beauv., Ess. Agrost. :101, 155–6, pl. 3, fig. 11 (1812); Bor, Fl. Iraq 9:167 (1968). *Festuca sylvatica* Hudson, Fl. Angl. 1:38 (1762). DARFUR Jebel Marra, massif, 2575 m; pumice cliff and stream bank. Blair 281 & 284; Wickens 1676 & 1678. DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia (Map 185); also in Europe, temperate Asia, Australia, North Africa and introduced into North America. FLORISTIC CATEGORY Palaeartic.

Note: Distinguished from *B. flexum* Nees which occurs on the Imatongs and uplands of E. and southern Africa by the smooth (instead of scabrid or scaberulous) culms and leaf sheath.

765 **Bromus leptoclados** Nees, Fl. Afr. Austr. :453 (1841); Wickens, For. Bull. 14(N.S.) :42 (1969); Clayton, F.T.E.A. Gramin. 1:68, fig. 23/1–13 (1970) & in F.W.T.A. ed. 2, 3:369 (1972). *B. cognatus* Steud., Syn. Pl. Glum. 1:321 (1854); Cuf., Enum. :1213 (1968). *B. runssoroënsis* K. Schum. in Engl., Pflanzenw. Ost-Afr. C:116 (1895); Andr., F.P.S. 3:414 (1956). DARFUR Jebel Marra 2750 m; upland meadow. Blair 364; Wickens 2477. DISTRIBUTION Uplands of Cameroon eastwards to the Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and south to the Cape; also in the Yemen (Map 186). FLORISTIC CATEGORY Afro-montane.

766 **Bromus pectinatus** Thunb., Prodr. Fl. Cap. 1:22 (1794); Clayton, F.T.E.A. Gramin. 1:68 (1970). *B. adöensis* Steud., Syn. Pl. Glum. 1:326 (1854); Broun & Massey, F.S. :484 (1929); Andr., F.P.S. 3:413 (1956); Quézel, Dossier 5:136 (1969). *B. tibesticus* Maire in Bull. Soc. Hist. Nat. Afr. Nord 34:140 (1943); Quézel, Univ. Alger Inst. Rech. Sahar. Mém. 4:118 (1958), **synon. nov.** [*B. japonicus* sensu Wickens, For. Bull. 14(N.S.) :42 (1969), *non* Thunb. (1784).] DARFUR Jebel Marra, massif, 1850–2650 m; arable and fallow lands. Jackson 3325, 2881, 4063 & 4068; Blair 274 & 291; Wickens 1439, 1449, 1686, 2433 & 2605; Kassas 665 (KHU & CAI, *n.v.*). Vernacular name: (Fur) *kawil* or *silmi*. DISTRIBUTION Sahara mountains and the uplands of Sudan Republic (Jebel Marra, Jebel Gurgeil and the Red Sea Hills), Ethiopia, Uganda and Kenya; also in Sinai and introduced into the Cape (Map 187). FLORISTIC CATEGORY Afro-montane and Saharo-montane. Note: Very close to *B. japonicus* Thunb. of warm temperate Europe and Asia. The spikelets are sometimes glabrous or pubescent (as in *B. tibesticus*).

767 **Calamagrostis epigejos** (L.) Roth, Tent. Fl. Germ. 1:34 (1788); Clayton, F.T.E.A. Gramin. 1:102 (1970). *Arundo epigejos* L., Sp. Pl. :81 (1753). var. **capensis** Stapf in Fl. Cap. 7:551 (1899); Wickens, For. Bull. 14(N.S.) :42 (1969); Clayton, F.T.E.A. Gramin. 1:102, fig. 35 (1970). DARFUR Jebel Marra, massif, 2450 m; moist ash soils. Blair 301; Wickens 1717. DISTRIBUTION Uplands of Sudan Republic (Jebel Marra), Uganda, Kenya and Tanzania; also in the Transvaal and Natal (Map 188). FLORISTIC CATEGORY Afro-montane. Note: var. *epigejos* occurs in temperate Europe and Asia and may be distinguished by its shorter spikelets, 4.5–6(–7) mm long, compared with 6–8 mm long in var. *capensis*, and shorter awns, 1–2 mm long, compared with 3–4 mm.

768 **Capillipedium parviflorum** (R. Br.) Stapf in F.T.A. 9:169 (1917); Wickens, For. Bull. 14(N.S.) :42 (1969); Cuf., Enum. :1388 (1970). *Holcus parviflorus* R. Br., Prodr. :199 (1810). DARFUR Jebel Marra, massif, 1780–2200 m; upland grassland. Jackson 3377; Blair 196; Wickens 1441. Vernacular name: (Fur) *kongne kongne*. DISTRIBUTION Sudan Republic (Jebel Marra), Kenya, Tanzania, Malawi and Rhodesia; also through tropical Asia, Australia and Polynesia. FLORISTIC CATEGORY Palaeotropical.

769 **Cenchrus biflorus** *Roxb.*, Fl. Ind. 1:238 (1820); Broun & Massey, F.S. :469 (1929); Andr., F.P.S. 3:415 (1956); Cuf., Enum. :1354 (1969); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:464 (1972).

C. barbatus Schumach., Beskr. Guin. Pl. :43 (1827); Stapf & Hubbard in F.T.A. 9:1079 (1934).

C. catharticus Delile, Cat. Hort. Monsp. 1838:4 (1839) & in Linnaea 13, Litt.-Bericht :103 (1839); Broun & Massey, F.S. :469 (1929).

DARFUR Jebel Marra, foothills, 1200 m; lowland plain, 1020 m; arable weed. *Blair* 161; *Wickens* 2299 & 2579. Vernacular name: (Fur) *kamel bawleh* or *nohgoss*; (Arabic) *haskaneit*.

DISTRIBUTION Mauritania to Cameroon eastwards to the Somali Republic and south through E. Africa to Mozambique, Rhodesia and Angola; also from Egypt and Arabia across to India. Widespread through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

770 **Cenchrus ciliaris** *L.*, Mant. Alt. :302 (1771); Stapf & Hubbard in F.T.A. 9:1072 (1934); Andr., F.P.S. 3:414 (1956); Cuf., Enum. :1355 (1969); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:464 (1972).

Pennisetum cenchroides *L. Rich.* in Pers., Syn. 1:72 (1805); Broun & Massey, F.S. :469 (1929).

DARFUR Jebel Marra, massif, 1780 m; lowland plain, 1050–1130 m; savanna and fallow lands. *Blair* 136 & 328; *Wickens* 2057; *Kassas* 852 (KHU & CAI, *n.v.*).

DISTRIBUTION Mauritania to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in N. Africa from Morocco to Egypt and extending through Arabia and the Middle East to India; introduced into America and Australia. Widespread through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.

771 **Chloris gayana** *Kunth*, Rév. Gram. 1:293, t.58 (1830); Broun & Massey, F.S. :479 (1929); Andr., F.P.S. 3:418 (1956); Cuf., Enum. :1289 (1968); Quézel, Dossier 5:137 (1969); Clayton in F.W.T.A. ed. 2, 3:400, fig. 433 (1972) & F.T.E.A. Gramin. :346 (1974).

DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; lowland plain, 1020–1130 m; arable land, wayside, stream banks and upland grassland. *Steele* 14; *Dandy* 57 & 71 (both BM, *n.v.*); *Jackson* 3297 & 3780; *Robertson* 140; *Pettet* J.3 & J.18; *Blair* 3, 6, 53, 110, 114, 116, 151, 231, 253 & 383; *Wickens* 1060; 1230, 1273, 1880, 2296, & 2715. Vernacular name: (Fur) *barria*. A valued pasture grass.

DISTRIBUTION Senegal to Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; introduced into many tropical and subtropical countries. Widely distributed through the central and southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian Region.

772 **Chloris lampproparia** *Stapf* in Mém. Soc. Bot. Fr. 2, 8:220 (1912); Andr., F.P.S. 3:416 (1956); Clayton in F.W.T.A. ed. 2, 3:400 (1972) & F.T.E.A. Gramin. :340, fig. 96/2 (1974).

DARFUR Lowland plain, 1020 m; savanna. *Jackson* 4040; *Blair* 160; *Wickens* 2304 & 2284.

DISTRIBUTION Mali, N. Nigeria and Cameroon eastwards to the central provinces of the Sudan Republic, Uganda and Tanzania.

FLORISTIC CATEGORY Sahelian Domain with Afriental extension.

773 **Chloris pilosa** *Schumach.*, Beskr. Guin. Pl. :55 (1827); Andr., F.P.S. 3:418 (1956); Cuf., Enum. :1290 (1968); Quézel, Dossier 5:137 (1969); Clayton in F.W.T.A. ed. 2, 3:400 (1972) & F.T.E.A. Gramin. :345 (1974).

C. breviseta *Benth.* in Hook., Niger Fl. :566 (1849); Broun & Massey, F.S. :480 (1929).

DARFUR Jebel Marra, piedmont, 1100 m; lowland plain, 1100–1130 m; *Acacia seyal* savanna. *Lynes* 521; *Blair* 133; *Wickens* 2279. Vernacular name: (Arabic) *koweel*.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia, Uganda and Tanzania. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

774 **Chloris prieurii** *Kunth*, Rév. Gram. 2:441, t.134 (1831); Andr., F.P.S. 3:419 (1956); Cuf., Enum. :1290 (1968); Clayton in F.W.T.A. ed. 2, 3:400 (1972) & F.T.E.A. Gramin. :342 (1974). *C. punctulata* *Hochst.* ex Steud., Syn. Pl. Glum. 1:205 (1854); Broun & Massey, F.S. :479 (1929).

DARFUR Lowland plain, 1130 m; *Acacia seyal* savanna. *Blair* 134 & 140.

DISTRIBUTION Senegal to N. Nigeria eastwards to the northern and central provinces of the Sudan Republic (Ethiopia *fide* Cufodontis *l. c.* but no specimens seen); also in Arabia and India.

FLORISTIC CATEGORY Sahelian and South Arabian Domains and Saharo-Sindian Region.

775 **Chloris pycnothrix** *Trin.*, Gram. Unif. Sesquifl. :234 (1824); Broun & Massey, F.S. :479 (1929); Andr., F.P.S. 3:418, fig. 98 (1956); Quézel, Dossier 5:137 (1969); Clayton in F.W.T.A. ed. 2, 3:400 (1972) & F.T.E.A. Gramin. :340 (1974).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; arable lands. *Pettet* J.11; *Blair* 18, 18a, 31, 128 & 382; *Wickens* 1047, 2466 & 2593.

DISTRIBUTION Sierra Leone to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in the Mediterranean area. Widespread in the Sudan but mainly in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian and Mediterranean Regions.

776 **Chloris robusta** *Stapf* in Mém. Soc. Bot. Fr. 2, 8:221 (1912); Andr., F.P.S. 3:416 (1956); Clayton in F.W.T.A. ed. 2, 3:400 (1972) & F.T.E.A. Gramin. :342, fig. 96/1 (1974).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; lowland plain, 1000 m. *Jackson* 2519; *Blair* 206; *Kassas* 461 :22, 482 & 539 (all KHU & CAI, *n.v.*).

DISTRIBUTION Sierra Leone to Cameroon eastwards to the southern provinces of the Sudan Republic and Uganda.

FLORISTIC CATEGORY Sudanian Domain.

777 **Chloris virgata** *Swartz*, Fl. Ind. Occ. 1:203 (1797); Broun & Massey, F.S. :479 (1929); Andr., F.P.S. 3:418, fig. 99 (1956); Cuf., Enum. :1292 (1969); Quézel, Dossier 5:137 (1969); Clayton in F.W.T.A. ed. 2, 3:400 (1972) & F.T.E.A. Gramin. :343, fig. 97 (1974).

DARFUR Jebel Marra, piedmont 1130–1160 m; lowland plain, 1020; river banks and moist sites. *Blair* 11, 126, 144 & 150; *Wickens* 1786, 2278 & 2295. Vernacular name: (Arabic) *koweel*.

DISTRIBUTION Mauritania to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; widespread through the tropics and subtropics. Widespread in the Sudan.

FLORISTIC CATEGORY Panropical.

778 **Ctenium newtonii** *Hackel* in Bol. Soc. Brot. 5:229 (1887); W. D. Clayton in Kew Bull. 16:471 (1963); *Wickens*, For. Bull. 14(N.S.) :43 (1969); Clayton in F.W.T.A. ed. 2, 1:398 (1972) & F.T.E.A. Gramin. :324 (1974).

C. schweinfurthii *Pilger* in Not. Bot. Gart. Berlin 9:116 (1924); Broun & Massey, F.S. :481 (1929); Andr., F.P.S. 3:421 (1956).

DARFUR Jebel Marra, piedmont and massif, 1160–2700 m; savanna and upland grassland. *Robertson* 12; *Blair* 177 & 208; *Wickens* 1128, 2545 & 2784; *Kassas* 325 & 607a (both KHU & CAI!).

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south through Uganda and the eastern Congo to Angola.

FLORISTIC CATEGORY Sudano-Zambezian Region.

779 **Ctenium somalense** (Chiov.) Chiov. in Nuov. Giorn. Bot. Ital., n. s. 26:82 (1919); Clayton in Kew Bull. 20:265 (1966); Cuf., Enum. :1283 (1968); Wickens, For. Bull. 14(N.S.) :43 (1969); Clayton in F.T.E.A. Gramin. :324, fig. 91 (1974). *C. nubicum* De Not. var. *somalense* Chiov. in Ann. R. Ist. Bot. Roma 7:72 (1897). *C. minus* (Pilger) W. D. Clayton in Kew Bull. 16:473 (1963). DARFUR Jebel Marra, piedmont and massif, 1160–2400 m; savanna and upland grassland. *Jackson* 3328; *Wickens* 2805. DISTRIBUTION Sudan (Jebel Marra), Somali Republic and E. Africa south to Malawi and Zambia, also in Madagascar. FLORISTIC CATEGORY Afriental and Zambeian Domains and Madagascan Region.

780 **Cymbopogon afronardus** Stapf in F.T.A. 9:279 (1919); Wickens, For. Bull. 14(N.S.) :43 (1969). DARFUR Jebel Marra, massif, 1770 m; fallow land. *Jackson* 3288 & 3290. DISTRIBUTION Southern provinces of the Sudan Republic southwards through E. Africa to Rhodesia and the Transvaal. FLORISTIC CATEGORY Afriental and Zambeian Domains.

781 **Cymbopogon caesius** (Nees) Stapf in Bull. Misc. Inf. Kew 1906:341, 360 (1906) & in F.T.A. 9:287 (1919); Andr., F.P.S. 3:423 (1956); Cuf., Enum. :1392 (1970). *Andropogon caesius* Nees ex Hook. & Arn., Bot. Beech. Voy. :244 (1838). DARFUR Jebel Marra, massif, 1350–2000 m. *Dandy* 172 (BM!); *Kassas* 341 (KHU & CAI, *n.v.*). DISTRIBUTION Sudan Republic (Jebel Marra) and Somali Republic; also in the Yemen and India. FLORISTIC CATEGORY Afriental and South Arabian Domains and Deccan Region.

782 **Cymbopogon commutatus** (Steud.) Stapf in Bull. Misc. Inf. Kew 1907:211 (1907); Andr., F.P.S. 3:422 (1956); Quézel, Dossier 5:137 (1969); Cuf., Enum. :1392 (1970); Clayton in F.W.T.A. ed. 2, 3:482 (1972). *Andropogon commutatus* Steud., Syn. Pl. Glum. 1:387 (1854). DARFUR Jebel Marra, piedmont and massif, 1350–1900 m; lowland plain 1030–1100 m; savanna and upland grassland. *Lynes* 528; *Dandy* 51 (BM!); *Blair* 40, 50 & 58; *Wickens* 2317, 2351, 2581, 2763 & 2781. Vernacular name: (Fur) *borr*; (Arabic) *marhabeib*. DISTRIBUTION Mauritania and Senegal eastwards to the Sudan Republic (Darfur) and western Ethiopia. FLORISTIC CATEGORY Sahelian Domain.

783 **Cymbopogon excavatus** (Hochst.) Stapf in F.T.A. 9:285 (1919); Broun & Massey, F.S. :450 (1929); Andr., F.P.S. 3:423 (1956); Cuf., Enum. :1393 (1970). *Andropogon excavatus* Hochst. in Flora 29:116 (1846). DARFUR Jebel Marra, piedmont and massif, 1130–2450 m; arable lands, savanna and upland grassland. *Pettet* J.22 & J.28; *Blair* 237, 252 & 293; *Wickens* 1697, 1932, 1936, 2244, 2548 & 2821. DISTRIBUTION Southern provinces and the Red Sea Hills of the Sudan Republic and Ethiopia southwards through E. Africa to the Cape. FLORISTIC CATEGORY Sudano-Zambezian Region.

784 **Cymbopogon giganteus** (Hochst.) Chiov., Gram. da Essenze :12 (1909); Stapf in F.T.A. 9:288 (1919); Broun & Massey, F.S. :450 (1929); Andr., F.P.S. 3:425 (1956); Quézel, Dossier 5:137 (1969); Cuf., Enum. :1394 (1970); Clayton in F.W.T.A. ed. 2, 3:482 (1972). *Andropogon giganteus* Hochst. in Flora 27:242 (1844). DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; lowland plain, 1020 m; arable and fallow lands and upland grassland. *Robertson* 8; *Blair* 38, 52, 66 & 221; *Wickens* 1270 & 1472.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic (Ethiopia *fide* Cufodontis *l. c.*) and south through E. Africa to Mozambique, Rhodesia and SW. Africa. FLORISTIC CATEGORY Sudano-Zambezian Region.

785 **Cymbopogon nervatus** (Hochst.) Chiov., Gram. da Essenze :10 (1909); Stapf in F.T.A. 9:283 (1919); Broun & Massey, F.S. :450 (1929); Andr., F.P.S. 3:423, fig. 100 (1956); Cuf., Enum. :1394 (1970). *Andropogon nervatus* Hochst. in Flora 27:243 (1844). DARFUR Jebel Marra, massif, 1750–2300 m; savanna. *Wickens* 981 & 1205; *Kassas* 556 (KHU & CAI, *n.v.*). DISTRIBUTION Northern and central provinces of the Sudan Republic, Ethiopia, Somali Republic and northern Kenya; also in tropical Asia. FLORISTIC CATEGORY Palaeotropical.

786 **Cymbopogon schoenanthus** (L.) Sprengel, Pl. Min. Cog. Pugill. Prim. 2:15 (1815); Stapf in F.T.A. 9:268 (1919); Wickens, For. Bull. 14(N.S.) :43 (1969); Cuf., Enum. :1395 (1970); Clayton in F.W.T.A. ed. 2, 3:482 (1972). *Andropogon schoenanthus* L., Sp. Pl. :1046 (1753). subsp. **proximus** (Hochst. ex A. Rich.) Maire & Weiller, Fl. Afr. Nord 1:287 (1952); Clayton, *l. c.* (1972). *A. proximus* Hochst. ex A. Rich., Tent. Fl. Abyss. 2:464 (1851). *Cymbopogon proximus* (Hochst. ex A. Rich.) Stapf in F.T.A. 9:271 (1919); Broun & Massey, F.S. :449 (1929); Andr., F.P.S. 3:422 (1956); Quézel, Dossier 5:137 (1969); Cuf., Enum. :1394 (1970). DARFUR Jebel Marra, massif, 2400–2600 m; lowland plain, 1020–1100 m; savanna and upland grassland. *Lynes* 359 & 526; *Robertson* 9; *Wickens* 2800. DISTRIBUTION Mauritania to N. Nigeria eastwards to Ethiopia. Widespread through the northern and central provinces of the Sudan, also in the Taposa area. FLORISTIC CATEGORY Sahelian and Afriental Domains.

787 **Cymbopogon sennarensis** (Hochst.) Chiov., Gram. da Essenze :16 (1909); Stapf in F.T.A. 9:270 (1919); Broun & Massey, F.S. :449 (1929); Andr., F.P.S. 3:422 (1956); Cuf., Enum. :1395 (1970). *Andropogon sennarensis* Hochst. in Flora 27:243 (1844). DARFUR Lowland plain, 1130 m; *Acacia seyal* savanna. *Blair* 143. DISTRIBUTION Widely scattered through the central provinces of the Sudan Republic (and ?Somali Republic *fide* Cufodontis *l. c.*). FLORISTIC CATEGORY Eastern Sahelian domain.

788 **Cynodon dactylon** (L.) Pers., Syn. Pl. 1:85 (1805); Broun & Massey, F.S. :479 (1929); Andr., F.P.S. 3:425, fig. 101 (1956); Cuf., Enum. :1284 (1968); Quézel, Dossier 5:137 (1969); Clayton in F.W.T.A. ed. 2, 3:403, fig. 434 (1972) & F.T.E.A. Gramin. :318 (1974). *Panicum dactylon* L., Sp. Pl. :58 (1753). *Cynodon glabratus* Steud., Syn. Pl. Glum. 1:212 (1854). DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 700–1020 m; alluvial soils and moist disturbed areas. *Blair* 86, 87, 89 & 319; *Wickens* 1356, 1766 & 2028. Vernacular name: (Fur) *barrda*, *barrta* or *marrrta*; (Arabic) *nagil* or *nagila*. DISTRIBUTION Senegal to the Somali Republic and south to the Cape; widespread through the warmer regions of the world. Widespread through the Sudan. FLORISTIC CATEGORY Panropical.

789 **Dactyloctenium aegyptium** (L.) Willd., Enum. Hort. Berol. :1029 (1809); Broun & Massey, F.S. :482 (1929); Andr., F.P.S. 3:427, fig. 102 (1956); Cuf., Enum. :1265 (1968); Quézel, Dossier 5:137 (1969); Clayton in F.W.T.A. ed. 2, 3:395, fig. 431 (1972) & F.T.E.A. Gramin. :252 (1974). *Cynosurus aegyptius* L., Sp. Pl. :72 (1753).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1120–1030 m; arable lands and alluvial soils. *Lynes* 631; *Blair* 84 & 138; *Wickens* 1744, 1759, 2047, 2066 & 2067. Vernacular name: (Fur) *doewi*; (Arabic) *abu asabie*.

DISTRIBUTION Mauritania to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; widely distributed in the tropics and sub-tropics of the Old World, penetrating into the Mediterranean region and introduced into the New World. Widespread through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

790 ***Desmostachya bipinnata*** (L.) *Stapf* in Fl. Cap. 7:632 (1900); *Andr.*, F.P.S. 3:429 (1956); *Cuf.*, Enum. :1261 (1968). *Briza bipinnata* L., Syst. Nat. ed. 10, 2:875 (1759). *Desmostachya cynosuroides* (Retz.) *Stapf* ex *Massey*, Sudan Grasses :43 (1926); *Broun & Massey*, F.S. :429 (1929).

DARFUR Lowland plain, 700 m; clay depression. *Blair* 317; *Wickens* 2023.

DISTRIBUTION Mauritania eastwards to Ethiopia; also from Tunisia eastwards to Egypt, through Arabia and the Middle East to India. In the Sudan it is found in north-eastern and central provinces.

FLORISTIC CATEGORY Saharo-Sindian Region, Sahelian and Afriental Domains.

791 ***Dichanthium papillosum*** (Hochst. ex A. Rich.) *Stapf* in F.T.A. 9:179 (1917); *Wickens*, For. Bull. 14(N.S.) :43 (1969); *Cuf.*, Enum. :1392 (1970).

Andropogon papillosus Hochst. ex A. Rich., Tent. Fl. Abyss. 2:457 (1851).

DARFUR Jebel Marra, foothills, 1000 m; river bed. *Wickens* 2997.

DISTRIBUTION Southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to the Cape.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

792 ***Digitaria abyssinica*** (Hochst. ex A. Rich.) *Stapf* in Bull. Misc. Inf. Kew 1907:213 (1907) & in F.T.A. 9:460 (1919); *Broun & Massey*, F.S. :454 (1929); *Cuf.*, Enum. :1326 (1969); *Clayton* in F.W.T.A. ed. 2, 3:452 (1972).

Panicum abyssinicum Hochst. ex A. Rich., Tent. Fl. Abyss. 2:360 (1851).

Digitaria vestita Fig. & De Not. in Mem. Acc. Tor. II, 14:356, fig. 22 (1854); *Andr.*, F.P.S. 3:435 (1956).

D. scalarum (Schweinff.) *Chiov.*, Miss. Stefanini-Paoli 1:225 (1916); *Wickens*, For. Bull. 14(N.S.) :43 (1969); *Cuf.*, Enum. :1332 (1969).

DARFUR Jebel Marra, piedmont, 1160 m; river bank. *Wickens* 1889.

DISTRIBUTION Cameroon to Arabia and south through E. Africa to South Africa; also in Madagascar and Ceylon.

FLORISTIC CATEGORY Sudano-Zambeian, Madagascan and Deccan Regions.

793 ***Digitaria ciliaris*** (Retz.) *Koeler*, Descr. Gram. Gallia et Germ. :27 (1802); *Wickens*, For. Bull. 14(N.S.) :43 (1969); *Clayton* in F.W.T.A. ed. 2, 3:453 (1972).

Panicum ciliare Retz., Obs. Bot. 4:16 (1786).

Digitaria adscendens (Kunth) *Henrad* in *Blumea* 1:92 (1934), incl. vars *nubica* (*Stapf*) *Henrad* & *chrysoblephara* (Fig. & DeNot.) *Henrad*; *Andr.*, F.P.S. 3:438 (1956); *Cuf.*, Enum. :1327 (1969); *Quézel*, Dossier 5:137 (1969).

D. marginata Link, Enum. Hort. Berol. 1:102 (1821); *Stapf* in F.T.A. 9:439 (1919), incl. vars.; *Broun & Massey*, F.S. :453 (1929).

DARFUR Jebel Marra, piedmont and massif, 1130–2300 m; lowland plain, 700–1100 m; river banks and moist places. *Lynes* 524; *Jackson* 3367; *Blair*, 12, 68, 96, 124 & 380; *Wickens* 1638, 1887 & 2468.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through E. Africa to Angola, Transvaal and Natal; widespread through the tropics of the Old World. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

794 ***Digitaria diagonalis*** (Nees) *Stapf* in Fl. Cap. 7:381 (1898); *Cuf.*, Enum. :1329 (1969); *Wickens*, For. Bull. 14(N.S.) :43 (1969); *Clayton* in F.W.T.A. ed. 2, 3:450 (1972).

Panicum diagonale Nees, Fl. Afr. Austr. :23 (1841).

var. ***hirsuta*** (DeWild. & Th. Dur.) *Troupin* in Fl. Garamba 1:29 (1956); *Clayton* l. c., fig. 444 (1972).

P. diagonale Nees var. *hirsutum* De Wild. & Th. Dur., Pl. Thonn. Cong. 1:4 (1900).

Digitaria uniglumis (Hochst. ex A. Rich.) *Stapf* var. *major* *Stapf* in F.T.A. 9:476 (1919); *Broun & Massey*, F.S. :454 (1929); *Andr.*, F.P.S. 3:433 (1956).

DARFUR Jebel Marra, massif, 1750–2000 m; upland grassland. *Blair* 35 & 197; *Wickens* 1937, 2148 & 2149.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambeian Region.

795 ***Digitaria gayana*** (Kunth) *Stapf* ex A. Chev., Sudania 1:163 (1911); *Stapf* in F.T.A. 9:449 (1919); *Broun & Massey*, F.S. :453 (1929); *Andr.*, F.P.S. 3:435 (1956); *Cuf.*, Enum. :1330 (1969); *Quézel*, Dossier 5:138 (1969); *Clayton* in F.W.T.A. ed. 2, 3:453 (1972).

Panicum gayanum Kunth, Rév. Gram. 1:239, t.31 (1829).

DARFUR Lowland plain, 1020 m; savanna. *Wickens* 2335.

DISTRIBUTION Mauritania to the central and southern provinces of the Sudan Republic and southwards to Rhodesia and Angola.

FLORISTIC CATEGORY Sudano-Zambeian Region.

796 ***Digitaria gazensis*** *Rendle* in Journ. Linn. Soc. Bot. 40:228, pl. 6, fig. 1–5 (1911); *Stapf* in F.T.A. 9:457 (1919).

[*D. sp. cf. D. polybotrya* sensu, *Wickens*, For. Bull. 14(N.S.) :43 (1969), non *Stapf* (1919).]

DARFUR Jebel Marra, piedmont, 1160 m; fallow lands. *Wickens* 1871.

DISTRIBUTION Sudan Republic (Darfur) and from Uganda and Kenya southwards to Mozambique, Rhodesia and SW. Africa.

FLORISTIC CATEGORY Afriental and Zambeian Domains.

797 ***Digitaria horizontalis*** Willd., Enum. Hort. Berol. :92 (1809); *Stapf* in F.T.A. 9:436 (1919); *Broun & Massey*, F.S. :453 (1929) pro parte; *Andr.*, F.P.S. 3:436 (1956); *Clayton* in F.W.T.A. ed. 2, 3:453 (1972).

DARFUR Lowland plain, 1020 m; arable and fallow lands. *Wickens* 1329, 1739, 2300 & 2302. Vernacular name: (Fur) *narra*; (Arabic) *umm aag* or *umm fraw*.

DISTRIBUTION Senegal to the Gabon eastwards to Ethiopia and south through E. Africa to Mozambique, Zambia and Angola.

In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambeian Region.

798 ***Digitaria longiflora*** (Retz.) *Pers.*, Syn. Pl. 1:85 (1805); *Stapf* in F.T.A. 9:469 (1919); *Andr.*, F.P.S. 3:435 (1956); *Cuf.*, Enum. :1330 (1969); *Clayton* in F.W.T.A. ed. 2, 3:453 (1972). *Paspalum longiflorum* Retz., Obs. Bot. 4:15 (1786).

DARFUR Lowland plain, 1620–1030 m; stream banks; *Wickens* 1976 & 2090.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal; widely distributed through the tropical of the Old World. Present in the southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

799 ***Digitaria ternata*** (A. Rich.) Stapf in Fl. Cap. 7:376 (1898) & in F.T.A. 9:452 (1919); Broun & Massey, F.S. :453 (1929); Andr., F.P.S. 3:434 (1956); Cuf., Enum. :1333 (1969); Quézel, Dossier 5:138 (1969); Clayton in F.W.T.A. ed. 2, 3:452 (1972). *Cynodon ternatus* A. Rich., Tent. Fl. Abyss. 2:405 (1851). DARFUR Jebel Marra, piedmont and massif, 1160–2400 m; arable lands. Jackson 4057 & 4059; Blair 98 & 379; Wickens 1591, 2190, 2469 & 2595. DISTRIBUTION Mali to Cameroon eastwards and south through E. Africa to the Cape; also in India, Malaysia and China. Widely distributed in the southern provinces of the Sudan. FLORISTIC CATEGORY Palaeotropical.

800 ***Digitaria velutina*** (Forsk.) P. Beauv., Ess. Agrost. Expl. Pl. :51 (1812); Andr., F.P.S. 3:435, fig. 105 (1956); Cuf., Enum. :1333 (1969). *Phalaris velutina* Forsk., Fl. Aegypt.-Arab. :17 (1775). [*Digitaria horizontalis* sensu Broun & Massey, F.S. :453 (1929) pro parte, *non* Willd (1809), sensu stricto.] DARFUR Jebel Marra, piedmont, 1160 m; moist plains. Blair 9 & 10; Wickens 2124. DISTRIBUTION Cameroon eastwards to the Somali Republic and south through Tanzania to Angola and the Transvaal; also in the Yemen. Widely distributed in the Sudan. FLORISTIC CATEGORY Sudano-Zambezian Region.

801 ***Diheteropogon amplexens*** (Nees) W. D. Clayton in Kew Bull. 20:75 (1966); Wickens, For. Bull. 14(N.S.) :43 (1969); Clayton in F.W.T.A. ed. 2, 3:489 (1972). *Andropogon amplexens* Nees, Fl. Austr. :104 (1841); Stapf in F.T.A. 9:243 (1919); Cuf., Enum. :1396 (1970). var. ***amplexens***; W. D. Clayton in l. c. (1966). DARFUR Jebel Marra, piedmont and massif, 1160–1500 m; forestry plantations. Blair 19 & 57. DISTRIBUTION Sudan Republic (Darfur) and from Kenya and Tanzania southwards to the Transvaal and Natal. FLORISTIC CATEGORY Afriental and Zambezian Domains.

802 var. ***catangensis*** (Chiov.) W. D. Clayton in l. c. (1966) & in l. c. (1972). *Andropogon amplexens* Nees var. *catangensis* Chiov. in Ann. Bot. Roma 13:38 (1914). DARFUR Jebel Marra, piedmont, 1160 m; savanna. Blair 182. DISTRIBUTION Senegal to N. Nigeria eastwards to the Sudan Republic (Darfur) and south through Tanzania to the Transvaal. FLORISTIC CATEGORY Sudano-Zambezian Region.

803 ***Echinochloa colona*** (L.) Link, Hort. Berol. 2:209 (1833); Stapf in F.T.A. 9:607 (1920); Broun & Massey, F.S. :459 (1929); Andr., F.P.S. 3:441, fig. 107 (1956); Cuf., Enum. :1319 (1969); Quézel, Dossier 5:138 (1969); Clayton in F.W.T.A. ed. 2, 3:439, fig. 441 (1972). *Panicum colonum* L., Syst. Nat. ed. 10, 2:870 (1759). DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; flood plain and arable lands. Blair 88 & 327; Wickens 1160, 1330, 1768, 1992 & 2046. DISTRIBUTION Mauritania to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; widespread through the tropics. Widely distributed through the Sudan. FLORISTIC CATEGORY Panropical.

804 ***Echinochloa crus-galli*** (L.) P. Beauv., Ess. Agrost. :53 (1812); Stapf in F.T.A. 9:610 (1920); Cuf., Enum. :1320 (1956); Wickens, For. Bull. 14(N.S.) :43 (1969). *Panicum crus-galli* L., Sp. Pl. :56 (1753). DARFUR Lowland plain, 900 m; *Acacia seyal* savanna. Blair 320; Wickens 2032.

DISTRIBUTION Central provinces of the Sudan Republic and Ethiopia south through Kenya and Tanzania to the Cape; rare in the tropics of Africa and America, very common in India and Malaya, a weed of warm temperate countries of the northern hemisphere. FLORISTIC CATEGORY Panropical.

805 ***Echinochloa frumentacea*** (Roxb.) Link, Hort. Berol. 1:204 (1827); Wickens, For. Bull. 14(N.S.) :43 (1969). *Panicum frumentaceum* Roxb., Fl. Ind. 1:307 (1820), *non* (L.) Salisb. (1796). DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1020 m; moist places. Blair 127; Wickens 2293. DISTRIBUTION Sudan Republic (Darfur), Kenya, Tanzania, Mozambique, Rhodesia and SW. Africa; cultivated and sometimes naturalized in tropical Africa and Asia. FLORISTIC CATEGORY Afriental and Zambezian Domains.

806 ***Echinochloa pyramidalis*** (Lam.) Hitchc. & Chase in Contrib. U.S. Nat. Herb. 18:345 (1917); Stapf in F.T.A. 9:615 (1920); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :460 (1929); Andr., F.P.S. 3:443, fig. 108 (1956); Cuf., Enum. :1321 (1929); Clayton in F.W.T.A. ed. 2, 3:439 (1972). *Panicum pyramidalis* Lam., Tab. Encycl. Méth. Bot. 1:171 (1791). DARFUR Jebel Marra, piedmont and massif, 1160–2150 m; stream banks. Lynes 176 (BM!); Steele 35; Dandy 167 (BM!); Blair 331; Wickens 2789. The seeds are eaten in times of famine. DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; introduced into India, Australia and America. Widespread in the Sudan along the Nile valley in the central and southern provinces. FLORISTIC CATEGORY Sudano-Zambezian Region.

807 ***Eleusine indica*** (L.) Gaertn., Fruct. & Sem. 1:8 (1788); Clayton in F.W.T.A. ed. 2, 3:395, fig. 432 (1972) & F.T.E.A. Gramin. :262 (1974). *Cynosurus indicus* L., Sp. Pl. :72 (1753). subsp. ***africana*** (Kennedy-O'Byrne) S. M. Phillips in Kew Bull. 27:259, figs. 1 & 2 (1972); Clayton, F.T.E.A. Gramin. :263 (1974). [*E. indica* sensu Broun & Massey, F.S. :481 (1929); Andr., F.P.S. 3:445, fig. 109 (1956), pro parte *non* (L.) Gaertn. sensu stricto.] *E. africana* Kennedy-O'Byrne in Kew Bull. 12:65 (1957); Cuf., Enum. :1263 (1968); Wickens, For. Bull. 14(N.S.) :43 (1969). DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; arable lands. Blair 122; Wickens 1741. Vernacular name: (Fur) *kaamo*, *mooru* or *nuum*; (Arabic) *durab* or *telebun*. DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape. Widespread through the central and southern provinces of the Sudan. (Map—Phillips l. c. map 2). FLORISTIC CATEGORY Sudano-Zambezian Region.

808 ***Elionurus hirtifolius*** Hackel in DC., Monogr. Phan. 6:341 (1889); Stapf in F.T.A. 9:63 (1917); Andr., F.P.S. 3:447 (1956); Clayton in F.W.T.A. ed. 2, 3:504 (1972). DARFUR Jebel Marra, piedmont and massif, 1160–1770 m; savanna. Blair 20 & 220; Wickens 1300 & 1581. DISTRIBUTION Ghana to Nigeria eastwards to the central provinces of the Sudan Republic. FLORISTIC CATEGORY Sahelian Domain.

809 ***Enteropogon macrostachyus*** (Hochst. ex A. Rich.) Munro ex Benth. in Journ. Linn. Soc. Bot. 19:101 (1881); Broun & Massey, F.S. :479 (1929); Andr., F.P.S. 3:448 (1956); Quézel, Dossier 5:136 (1969); Clayton in F.W.T.A. ed. 2, 3:402 (1972) & F.T.E.A. Gramin. :332 (1974). *Chloris macrostachya* Hochst. ex A. Rich., Tent. Fl. Abyss. 2:408 (1851).

DARFUR Jebel Marra, piedmont and massif, 1130–1760 m; savanna. *Blair* 337 & 347; *Wickens* 1381 & 2230. Vernacular name: (Fur) *koroh*.

DISTRIBUTION Ghana (Accra Plain), Sudan Republic, Ethiopia and Somali Republic southwards through E. Africa to the Transvaal and SW. Africa. In the Sudan it is a rare grass found in Darfur and the Toposa area.

FLORISTIC CATEGORY Sudano-Zambezian Region.

810 ***Eragrostis arenicola*** *C. E. Hubbard* in Kew Bull. 4:345 (1949); Andr., F.P.S. 3:452 (1956); Clayton in F.W.T.A. ed. 2, 3:386 (1972) & F.T.E.A. Gramin. :207 (1974).

DARFUR Jebel Marra, piedmont and massif, 1160–1525 m; arable lands. *Pettet* J.12, J.13, & J.19; *Blair* 81, 83, 112 & 113.

DISTRIBUTION N. Nigeria and Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Mozambique, Rhodesia and Angola.

FLORISTIC CATEGORY Sudano-Zambezian Region.

811 ***Eragrostis aspera*** (*Jacq.*) *Nees*, Pl. Afr. Austr. :408 (1841); Broun & Massey, F.S. :478 (1929); Andr., F.P.S. 3:452, fig. 111 (1956); Cuf., Enum. :1248 (1968); Quézel, Dossier, 5:138 (1969); Clayton in F.W.T.A. ed. 2, 3:387, fig. 429 (1972) & F.T.E.A. Gramin. :209, fig. 60/6 (1974).

Poa aspera Jacq., Hort. Vinob. 3:22, fig. 56 (1776).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1020–110 m; arable weed. *Lynes* 520; *Pettet* J.15; *Blair* 15, 82 & 170; *Wickens* 1124, 1475, 1884, 2705 & 2788. Vernacular name: (Fur) *aba nankair*; (Arabic) *hemeira*.

DISTRIBUTION Sierra Leone to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in the Mascarene Is. and India. Widely distributed through the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

812 ***Eragrostis atrovirens*** (*Desf.*) *Trin. ex Steud.*, Nom. Bot. ed. 2, 1:562 (1840); Andr., F.P.S. 3:456 (1956); Quézel, Dossier 5:138 (1969); Clayton in F.W.T.A. ed. 2, 3:390 (1972) & F.T.E.A. Gramin. :217 (1974).

var. ***atrovirens***; Cuf., Enum. :1248 (1968).

Poa atrovirens Desf., Fl. Atlant. 1:73, t.14 (1798).

Eragrostis sudanica A. Chev. in Bull. Mus. Hist. Nat. II, 20:471 (1948).

DARFUR Jebel Marra, piedmont and massif, 1160–2700 m; stream banks. *Steele* 21; *Jackson* 2549, 3299 & 3350; *Robertson* 152; *Blair* 16, 148 & 334; *Wickens* 1104, 1414, 1465 & 2219. Vernacular name: (Fur) *kogne kogne*.

DISTRIBUTION Mauritania to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Natal, Transvaal and SW. Africa; also in India, Malaysia and the Philippines.

FLORISTIC CATEGORY Palaeotropical.

813 ***Eragrostis cilianensis*** (*All.*) *Lutati* in Malpighia 18:386 (1904); Andr., F.P.S. 3:456 (1956); Quézel, Dossier 5:139 (1969); Clayton in F.W.T.A. ed. 2, 3:390 (1972) & F.T.E.A. Gramin. :232, fig. 65 (1974).

Briza eragrostis L., Sp. Pl. :70 (1753), non *Poa eragrostis* L. (1753).

Poa cilianensis All., Fl. Ped. 2:246, fig. 91/2 (1785).

Eragrostis major (L.) Host, Gram. Austr. 4:14, t.24 (1809);

Broun & Massey, F.S. :476 (1929).

E. schweinfurthiana Jedw. in Mez, Bot. Archiv. 5:194 (1924).

DARFUR Jebel Marra, piedmont and massif, 1160–2130 m; lowland plain, 1020 m; arable lands. *Steele* 33; *Pettet* J.10 & J.14; *Blair* 14, 28, 29, 32, 55, 99 & 100; *Wickens* 1050, 1336, 1402, 1403, 1483, 1885, 1990, 2039, 2216, 2253 & 2787. Vernacular name: (Fur) *kogne kogne*; (Arabic) *bannu*.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; widely distributed through the tropical and warm temperate regions of the Old World, introduced into the New World. Widely distributed in the Sudan.

FLORISTIC CATEGORY Palaeotropical.

814 ***Eragrostis ciliaris*** (L.) *R.Br.* in Tuckey, Narr. Exp. Congo App. :478 (1818); Broun & Massey, F.S. :477 (1929); Andr., F.P.S. 3:450 (1956); Cuf., Enum. :1250 (1969); Quézel, Dossier 5:139 (1969); Clayton in F.W.T.A. ed. 2, 3:386 (1972) & F.T.E.A. Gramin. :204, fig. 60/2 (1974).

Poa ciliaris L., Syst. Nat. ed. 10, 2:875 (1759).

DARFUR Lowland plain, 1020 m; arable lands. *Wickens* 1322, 1743, & 2494. Vernacular name: (Fur) *kleet*; (Arabic) *danab el asad*.

DISTRIBUTION Senegal to Gabon eastwards to the Somali Republic and south through E. Africa to the Cape; also through Arabia and the Mascarene Is. to India, and in tropical America. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Panropical.

815 ***Eragrostis cylindriflora*** *Hochst.* in Flora 38:224 (1855); Cuf., Enum. :1251 (1968); Clayton in F.W.T.A. ed. 2, 3:391 (1972) & F.T.E.A. Gramin. :239, fig. 66 (1974).

E. cylindriflora Hochst. var. *gymnorhachis* Schweinf. in Bull.

Herb. Boiss. 2, App. 2:40 (1894); Cuf., Enum. :1251 (1968);

Wickens, For. Bull. 14(N.S.) :44 (1969).

[*E. aulacosperma* sensu Wickens, l. c. (1969), non (Fresen.) Steud. (1840).]

DARFUR Jebel Marra, massif, 1780 m; lowland plain, 1000–

1100 m; wayside and arable lands. *Blair* 137; *Wickens* 1405 &

2002. Vernacular name: (Fur) *kaia* or *kogne kogne*; (Arabic) *bannu*, *ghabash* or *magash*.

DISTRIBUTION Ghana to Niger Republic eastwards to Sudan Republic (Darfur), Ethiopia and south through E. Africa to the Transvaal and SW. Africa.

FLORISTIC CATEGORY Sudano-Zambezian Region.

816 ***Eragrostis gangetica*** (*Roxb.*) *Steud.*, Syn. Glum. 1:266 (1854); Andr., F.P.S. 3:454 (1956); Cuf., Enum. :1252 (1968); Clayton in F.W.T.A. ed. 2, 3:389 (1972) & F.T.E.A. Gramin. :217, fig. 60/12 (1974).

Poa gangetica Roxb., Fl. Ind. 1:340 (1820).

DARFUR Jebel Marra, piedmont and massif, 1160–1525 m; stream bank. *Pettet* J.8; *Blair* 290; *Wickens* 1692.

DISTRIBUTION Mauritania to Gabon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and SW. Africa; also in India. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

817 ***Eragrostis namaquensis*** *Schrader* in Linnaea 12:452 (1838); Broun & Massey, F.S. :478 (1929); Andr., F.P.S. 3:452 (1956); Cuf., Enum. :1254 (1968); Clayton in F.W.T.A. ed. 2, 3:387 (1972) & F.T.E.A. Gramin. :208, fig. 60/4 (1974).

var. ***namaquensis***; Clayton in F.W.T.A. ed. 2, 3:387 (1972) & F.T.E.A. Gramin. :208 (1974).

DARFUR Jebel Marra, piedmont and massif, 1160–1850 m;

lowland plain, 1000 m; stream bank. *Jackson* 3281; *Robertson* 35; *Blair* 191, 209 & 224.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to the Cape.

FLORISTIC CATEGORY Sudano-Zambezian Region.

818 var. ***diplachnoïdes*** (*Steud.*) *W. D. Clayton* in Kew Bull. 25:251 (1971), in F.W.T.A. ed. 2, 3:387 (1972) & F.T.E.A. Gramin. :209 (1974).

Eragrostis diplachnoïdes Steud., Syn. Pl. Glum. 1:268 (1854);

Andr., F.P.S. 3:452, fig. 110 (1956); Cuf., Enum. :1252 (1968).

E. hochstetteri Steud., Syn. Pl. Glum. 1:268 (1854).

Glyceria pilosa Steud., Syn. Pl. Glum. 1:287 (1854).

[*E. interrupta* sensu Broun & Massey, F.S. :477 (1929), non (R.Br.) P. Beauv. (1812).]

DARFUR Lowland plain, 1020 m; moist places. *Wickens* 1130 & 1150.

DISTRIBUTION Senegal to Nigeria eastwards to Ethiopia and south through E. Africa to Rhodesia; also from Egypt across to India and Thailand. Widely distributed through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

819 **Eragrostis pilosa** (L.) P. Beauv., Ess. Agrost. :71, 162, 175 (1812); Broun & Massey, F.S. :476 (1929); Andr., F.P.S. 3:454 (1956); Cuf., Enum. :1256 (1968); Quézel, Dossier 5:139 (1969); Clayton in F.W.T.A. ed. 2, 3:389 (1972) & F.T.E.A. Gramin. :214, fig. 61/1 (1974).

Poa pilosa L., Sp. Pl. :68 (1753).

Eragrostis tenuiflora Steud., Syn. Pl. Glum. 1:268 (1854).

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; lowland plain, 730–1020 m; stream banks and moist places.

Blair 33, 78, 248, 316 & 381; *Wickens* 1000, 1991, 2077, 2164, 2212 & 2467; *Kassas* 635 (KHU & CAI!).

DISTRIBUTION Mauritania to Nigeria eastwards to Ethiopia and south through E. Africa to the Cape; widely distributed through the tropical and warm temperate regions of the Old World, introduced into the New World. Widely distributed throughout the Sudan.

FLORISTIC CATEGORY Palaeotropical.

820 **Eragrostis tenella** (L.) P. Beauv. ex Roem. & Schultes, Syst. Veg. 2:576 (1817); Andr., F.P.S. 3:452 (1956); Cuf., Enum. :1260 (1968); Clayton in F.W.T.A. ed. 2, 3:386 (1972) & F.T.E.A. Gramin. :206 (1974).

Poa tenella L., Syst. Veg. :69 (1753).

[*Eragrostis viscosa* sensu Wickens, For. Bull. 14(N.S.) :44 (1969), non (Retz.) Trin. (1830).]

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; flood plain and arable lands. *Blair* 173 & 325; *Wickens* 2040, 2042 & 2776.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to Natal and the Transvaal; widespread through the tropics of the Old World, introduced into America. In the Sudan it is found in Darfur and the Red Sea Hills.

FLORISTIC CATEGORY Palaeotropical.

821 **Eragrostis tremula** (Lam.) Hochst. ex Steud., Syn. Pl. Glum. 1:269 (1854); Broun & Massey, F.S. :476 (1929); Andr., F.P.S. 3:456 (1956); Cuf., Enum. :1260 (1968); Quézel, Dossier 5:139 (1969); Clayton in F.W.T.A. ed. 2, 3:391 (1972) & F.T.E.A. Gramin. :236, fig. 62/5 (1974).

Poa tremula Lam., Tab. Encycl. Méth. Bot. 1:185 (1791).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020–1050 m; arable lands and scree slopes. *Robertson* 15; *Blair* 157; *Wickens* 1125 & 2749. Vernacular name: (Fur) *barrta*; (Arabic) *bannu*.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola; also across to India and Burma. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

822 **Eragrostis turgida** (Schumacher) DeWild., Comp. Kasai :250 (1910); Andr., F.P.S. 3:458 (1956); Clayton in F.W.T.A. ed. 2, 3:387 (1972) & F.T.E.A. Gramin. :223, fig. 61/8 (1974). *Poa turgida* Schumacher in Schum. & Thonn., Beskr. Guin. Pl. :86 (1827).

Eragrostis rubiginosa Trin. in Mém. Acad. Pétersb. VI, 1:401 (1830); Broun & Massey, F.S. :477 (1929).

DARFUR Jebel Marra, piedmont, 1160 m; alluvial soils. *Blair* 172.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and Uganda.

FLORISTIC CATEGORY Sudanian Domain.

823 **Eriochloa fatmensis** (Hochst. & Steud.) W. D. Clayton in Kew Bull. 30:108 (1975).

Panicum fatmense Hochst. & Steud. in sched., Schimper, It. Un. :806 (1837).

Poa annulatum A. Rich., Tent. Fl. Abyss. 2:370 (1851), non

Eriochloa annulatum (Fluegge) Kunth (1829), nec. *Helopus annulatum* (Fluegge) Nees (1829).

Helopus nubicus Steud., Syn. Pl. Glum. 1:100 (1854).

Eriochloa acrotricha (Steud.) Hackel ex Thell. in Viert. Nat. Ges.

Zürich 52:435 (1907); nom. illegit., non *E. acrotricha* (Hook.f.)

Schinz (1905), Stapf in F.T.A. 9:499 (1919); Broun & Massey, F.S. :455 (1929).

E. nubica (Steud.) Hackel & Stapf ex Thell. in Viert. Nat. Ges.

Zürich 64:697 (1919); Andr., F.P.S. 3:460, fig. 114 (1956); Cuf., Enum. :1334 (1969).

DARFUR Jebel Marra, piedmont 1160 m; lowland plain, 1020 m; moist places. *Wickens* 2213 & 2291.

DISTRIBUTION Mauritania to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in Arabia and introduced into India and Australia. Widely distributed in the central and southern provinces of the Sudan, also in the Red Sea Hills.

FLORISTIC CATEGORY Sudano-Zambezian Region.

824 **Euclasta condylotricha** (Hochst. ex Steud.) Stapf in F.T.A. 9:181 (1917); Andr., F.P.S. 3:460 (1956); Cuf., Enum. :1391 (1970); Clayton in F.W.T.A. ed. 2, 3:471 (1972).

Andropogon condyloctrichus Hochst. ex Steud., Syn. Pl. Glum. 1:377 (1854).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; savanna. *Blair* 389; *Wickens* 2557 & 2741.

DISTRIBUTION Sierra Leone to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola; also in tropical America and known from a single gathering in India. A rare grass in the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region and Neotropical.

825 **Festuca abyssinica** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:432 (1851); Cuf., Enum. :1210 (1968); Wickens For. Bull. 14(N.S.) :44 (1969); Clayton, F.T.E.A. Gramin. :60 (1970) & in F.W.T.A. ed. 2, 3:369 (1972). var. **abyssinica**; Clayton, F.T.E.A. Gramin. :60, fig. 21 (1970). *F. rigidula* Steud., Syn. Pl. Glum. 1:314 (1854); Andr., F.P.S. 3:461 (1956).

F. tibetica de Miré & Quézel in Bull. Soc. Bot. Fr. 106 :138, fig. 3 (1959), **synon. nov.**

DARFUR Jebel Marra, massif, 2400–2900 m; upland meadow.

Jackson 3343 & 3358; *Gillet* s.n. (MARS!) *Blair* 239, 304, 359, 360, 271 & 388; *Wickens* 1718, 2419, 2472a & 2481.

DISTRIBUTION Uplands of Cameroon eastwards to the Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and south through E. Africa to Rhodesia (Map 189).

FLORISTIC CATEGORY Afro-montane.

826 **Gastridium phleoides** (Nees & Meyen) C. E. Hubbard in Kew Bull. 9:375 (1954); Wickens, For. Bull. 14(N.S.) :44 (1969); C. E. Hubbard in Clayton, F.T.E.A. Gramin. :100, fig. 34 (1970). *Lachnagrostis phleoides* Nees & Meyen in Nov. Act. Acad. Caes.

Leop. Carol. 19, Suppl. 1:14 (1841), :146 (1843).

[*Gastridium ventricosum* sensu C. E. Hubbard in F.T.A. 10:163 (1937); Andr., F.P.S. 3:461 (1956); Cuf., Enum. :1232 (1968), non (Gouan) Schinz & Thell. (1913).]

DARFUR Jebel Marra, massif, 2450 m; upland meadow. *Wickens* 2409.

DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia and Kenya; also in the Mediterranean Region and introduced into S. Africa, Australia and the Americas (Map 190).

FLORISTIC CATEGORY Afro-montane and Mediterranean Regions.

827 **Hackelochloa granularis** (L.) Kuntze, Rev. Gen. Pl. 2:776 (1891); Andr., F.P.S. 3:461 (1956); Cuf., Enum. :1367 (1969); Clayton in F.W.T.A. ed. 2, 3:505 (1972).

Cenchrus granularis L., Mant. 2, App. :575 (1771).
Manisuris granularis (L.) L.f., Nov. Gram. Gen. :40 (1779); Stapf in F.T.A. 9:57 (1917); Broun & Massey, F.S. :441 (1929).
 DARFUR Jebel Marra, piedmont and massif, 1130–1340 m; arable lands and wayside. *Blair* 129 & 343; *Wickens* 2179, 2235 & 2504.
 DISTRIBUTION Gambia to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola; widespread through the tropics. Widely distributed through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Pantropical.

828 ***Harpachne schimperi*** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:431 (1851); Andr., F.P.S. 3:463, fig. 115 (1956); Cuf., Enum. :1262 (1968); Clayton, F.T.E.A. :270, fig. 74/1–8 (1974).
 DARFUR Jebel Marra, massif, 1900–2450 m; fallow lands and upland meadow. *Dandy* 179 (BM!); *Jackson* 3322; *Blair* 366; *Wickens* 1269, 1471, & 2616; *Kassas* 633 (KHU & CAI, n.v.).
 DISTRIBUTION Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia, Uganda, Kenya and Tanzania, Zambia, and extending into the eastern Congo.
 FLORISTIC CATEGORY Afrioriental and Zambeian Domains.

829 ***Helictotrichon elongatum*** (Hochst. ex A. Rich.) C. E. Hubbard in Bull. Misc. Inf. Kew 1936:335 (1936) & in F.T.A. 10:114 (1937); Andr., F.P.S. 3:463 (1956); Cuf., Enum. :1226 (1968); Clayton, F.T.E.A. Gramin. :89, fig. 30 (1970) & in F.W.T.A. ed. 2, 3:372 (1972).
Danthonia elongata Hochst. ex A. Rich., Tent. Fl. Abyss. 2:419 (1851).
Helictotrichon cartilagineum C. E. Hubbard in *op. cit.* :331 (1936) & in F.T.A. 10:112 (1937).
H. phaneroneuron C. E. Hubbard in *op. cit.* :332 (1936) & in F.T.A. 10:109 (1937).
Avena tibetica de Miré & Quézel in Bull. Soc. Bot. Fr. 106:135, fig. 1 (1959), **synon. nov.**
 [*Helictotrichon* sp. aff. *H. lachnanthum* sensu Wickens, For. Bull. 14(N.S.) :44 (1969), *non* (Hochst.) C. E. Hubbard (1936).]
 DARFUR Jebel Marra, massif, 1850–2750 m; upland meadow. *Jackson* 3386a; *Gillet* s.n. (MARS!); *Blair* 240, 294, 303, 349, 363 & 370; *Wickens* 1434, 2472b, 2478, 2487 & 2672.
 DISTRIBUTION Uplands of Cameroon, Chad (Tibesti), Sudan Republic (Jebel Marra and the Imatongs) and Ethiopia southwards through E. Africa to Rhodesia; also in Madagascar (Map 191).
 FLORISTIC CATEGORY Afro-montane and Madagascan Region.

830 ***Hemarthria natans*** Stapf in F.T.A. 9:56 (1917); Cuf., Enum. :1367 (1969); Wickens, For. Bull. 14(N.S.) :44 (1969). [*H. altissima* sensu Wickens, For. Bull. 14(N.S.) :44 (1969), *non* (Poir.) Stapf & Hubbard (1934).]
 DARFUR Jebel Marra, piedmont, 1160 m; marshy places. *Blair* 211 & 342; *Wickens* 2222, 2965 & 2968.
 DISTRIBUTION Sudan Republic (Darfur), Ethiopia and south through E. Africa to Zambia and Angola; also in Madagascar.
 FLORISTIC CATEGORY Afrioriental and Zambeian Domains and Madagascan Region.

831 ***Heteropogon contortus*** (L.) P. Beauv. ex Roem. & Schultes, Syst. Veg. 2:836 (1817); Stapf in F.T.A. 9:411 (1919); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :452 (1929); Andr., F.P.S. 3:463, fig. 115 (1956); Quézel, Dossier 5:139 (1969); Cuf., Enum. :1411 (1970); Clayton in F.W.T.A. ed. 2, 3:473, fig. 451 (1972).
Andropogon contortus L., Sp. Pl. :1045 (1753).
 DARFUR Jebel Marra, piedmont and massif, 1130–1780 m; lowland plain, 1000 m; savanna. *Lynes* 177 (BM!); *Blair* 61 & 175; *Wickens* 1392, 1939, 2004, 2210 & 2232. Vernacular name: (Fur) *seebi*; (Arabic) *umm dafufu*.

DISTRIBUTION Sierra Leone to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in the Mediterranean region and the tropics generally. Widespread through the central and southern provinces of the Sudan.
 FLORISTIC CATEGORY Pantropical.

832 ***Heteropogon melanocarpus*** (Elliott) Benth. in Journ. Linn. Soc. Bot. 19:71 (1881); Stapf in F.T.A. 9:413 (1919); Wickens, For. Bull. 14(N.S.) :44 (1969); Cuf., Enum. :1412 (1970); Clayton in F.W.T.A. ed. 2, 3:473 (1972).
Andropogon melanocarpus Elliott, Sketch. Bot. S. Carol. 1:146 (1816).
 DARFUR Jebel Marra, piedmont and massif, 1150–1340 m; lowland plain 1020 m; savanna fallow lands and waste places. *Blair* 153; *Wickens* 1566, 2459 & 2755.
 DISTRIBUTION Senegal to Cameroon eastwards to the central provinces of the Sudan Republic (Ethiopia *fide* Cufodontis *l. c.*) and south through E. Africa to the Transvaal and SW. Africa; widespread through the tropics of the Old and New World.
 FLORISTIC CATEGORY Pantropical.

833 ***Hyparrhenia anamesa*** W. D. Clayton, Kew Bull. Add. Ser. 2, :85, fig. 21 (1969); Wickens, For. Bull. 14(N.S.) :45 (1969).
 DARFUR Jebel Marra, massif, 1920 m; upland meadow. *Wickens* 2991.
 DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and south through E. Africa to the Cape (Map—Clayton *l. c.* map 6).
 FLORISTIC CATEGORY Afrioriental and Zambeian Domains.

834 ***Hyparrhenia anthistirioides*** (Hochst. ex A. Rich) Anderss. ex Stapf in F.T.A. 9:331 (1918); Andr., F.P.S. 3:470 (1956); W. D. Clayton, Kew Bull. Add. Ser. 2, :106 (1969); Wickens, For. Bull. 14(N.S.) :45 (1969); Cuf., Enum. :1402 (1970).
Andropogon anthistirioides Hochst. ex A. Rich., Tent. Fl. Abyss. 2:463 (1851).
Hyparrhenia pseudocymbaria (Steud.) Stapf in F.T.A. 9:329 (1918); Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :451 (1929); Andr., F.P.S. 3:470 (1956); Cuf., Enum. :1408 (1970).
 DARFUR Jebel Marra, piedmont and massif, 1060–2300 m; lowland plain, 1020–1100 m; fallow lands and waste places. *Lynes* 180, 181 & 522; *Jackson* 2537, 2604, 3287, 3368, 3370, 3873 & 4041; *Pellet* J.23, J.44 & J.45; *Blair* 179 & 241; *Wickens* 1059, 1251, 1457, 2530, 2542, 2552, 2582, 2601, 2711, 2713 & 2791; *Kassas* 5476 (KHU & CAI, n.v.). A widespread and common grass on both volcanic and basement complex soils, especially moist soils or fallow lands, throughout the survey area. Vernacular name: (Fur) *aweas*.
 DISTRIBUTION Sudan Republic (Darfur and Kassala Provinces), Ethiopia and Somali Republic south through E. Africa to Malawi and Zambia (Map—Clayton *l. c.* map 8).
 FLORISTIC CATEGORY Sudano-Zambeian Region.

835 ***Hyparrhenia collina*** (Pilger) Stapf in F.T.A. 9:337 (1918); W. D. Clayton, Kew Bull. Add. Ser. 2, :130 (1969); Wickens, For. Bull. 14(N.S.) :45 (1969); Cuf., Enum. :1402 (1970); Clayton in F.W.T.A. ed. 2, 3:494 (1972).
Andropogon collinus Pilger in Mildbr., Wiss. Ergebn. Deutsch. Zentr. Afr. Exped. 2:43 (1910), *non* Lojac (1909).
 DARFUR Jebel Marra, piedmont and massif, 1160–2300 m. *Jackson* 2559; *Kassas* 674 (KHU & CAI, n.v.).
 DISTRIBUTION N. Nigeria, Cameroon, Sudan Republic (Darfur), Ethiopia and south through E. Africa to Natal (Map—Clayton, *l. c.* map. 10).
 FLORISTIC CATEGORY Sudano-Zambeian Region.

836 ***Hyparrhenia confinis*** (Hochst. ex A. Rich.) Anderss. ex Stapf in F.T.A. 9:353 (1918); Broun & Massey, F.S. :451 (1929); Andr., F.P.S. 3:473 (1956); W. D. Clayton, Kew Bull. Add. Ser. 2, :137, fig. 29 (1969); Cuf., Enum. :1403 (1970).

Andropogon confinis Hochst. ex A. Rich., Tent. Fl. Abyss. 2:461 (1851).

var. **nudiglumis** (Hackel) W. D. Clayton, Kew Bull. Add. Ser. 2, :139 (1969); Wickens, For. Bull. 14(N.S.):45 (1969).
A. confinis Hochst. ex A. Rich. var. *nudiglumis* Hack. in DC., Monogr. Phan. 6:64 (1889).

DARFUR Lowland plain, 1020–1100 m; savanna. *Lynes* 525; *Wickens* 2340.

DISTRIBUTION Central provinces of the Sudan Republic and its borders with Ethiopia (Map = Clayton *l. c.* map 11).

FLORISTIC CATEGORY Eastern Sudanian Domain.

837 **Hyparrhenia cymbaria** (L.) Stapf in F.T.A. 9:332 (1918); Broun & Massey, F.S. :451 (1929); Andr., F.P.S. 3:471, fig. 118 (1956); W. D. Clayton, Kew Bull., Add. Ser. 2, :110 (1969); Cuf., Enum. :1403 (1970); Clayton in F.W.T.A. ed. 2, 3:494 (1972).

Andropogon cymbarius L., Mant. Alt. :303 (1771).

DARFUR Jebel Marra, massif, 1500 m. *Pettet* J.39.

DISTRIBUTION Southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to the Cape, with isolated localities in Nigeria and Cameroon; also in Madagascar and Comoro Is. (Map—Clayton *l. c.* map 9).

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

838 **Hyparrhenia dichroa** (Steud.) Stapf in F.T.A. 9:302 (1919); Clayton, Kew. Bull. Add. Ser. 2, :68 (1969); Wickens, For. Bull. 14(N.S.):45 (1969); Cuf., Enum. :1403 (1970).
Andropogon dichroos Steud., Syn. Pl. Glum. 1:389 (1854).
 DARFUR Jebel Marra, piedmont and massif, 1160–2150 m; lowland plain, 1020–1100 m; irrigated gardens and marshy places. *Lynes* 625; *Steele* 45; *Jackson* 2525; *Blair* 2; *Wickens* 2771.
 DISTRIBUTION Sudan Republic (Darfur) and from Ethiopia southwards through E. Africa to Natal (Map—Clayton *l. c.* Map 4).

FLORISTIC CATEGORY Afrioriental and Zambezian Domains.

839 **Hyparrhenia dregeana** (Nees) Stapf ex Stent in Bothalia 1:249 (1923); Clayton, Kew Bull. Add. Ser. 2, :124 (1969); Wickens, For. Bull. 14(N.S.):45 (1969).

Andropogon dregeanus Nees, Fl. Afr. Austr. 1:112 (1841).

Hyparrhenia elongata Stapf in F.T.A. 9:343 (1918).

H. phyllopoda Stapf in F.T.A. 9:346 (1918).

[*Andropogon linearis* sensu Norman in Journ. Bot. 62:135 (1924); Broun & Massey, F.S. :449 (1929), non Stapf (1919).]

[*Hyparrhenia papillipes* sensu. Andr., F.P.S. 3:473 (1956); Quézel, Dossier 5:139 (1969), non (Hochst. ex A. Rich.) Anderss. ex Stapf (1918).]

DARFUR Jebel Marra, massif, 1350–2500 m; upland grassland.

Lynes 179; *Jackson* 263, 3295 & 3385; *Blair* 36, 42, 43, 44 & 297.

DISTRIBUTION Sudan Republic (Jebel Marra, the Imatongs and Didinga Hills), Ethiopia and south through E. Africa to the Cape, also in Cameroon (Map—Clayton *l. c.* map 10).

FLORISTIC CATEGORY Afrioriental and Zambezian Domains with Sudanian extensions.

840 **Hyparrhenia filipendula** (Hochst.) Stapf in F.T.A. 9:323 (1918); Andr., F.P.S. 3:468 (1956); Clayton, Kew Bull. Add. Ser. 2, :95 (1969); Cuf., Enum. :1404 (1970); Clayton in F.W.T.A. ed. 2, 3:494 (1972).

Andropogon filipendulus Hochst. in Flora 29:115 (1846).

var. **filipendula**; Clayton, *l. c.* :95 (1969); Wickens, For. Bull. 14(N.S.):44 (1969); Clayton in *l. c.* (1972).

DARFUR Jebel Marra, piedmont, 1160 m; arable land. *Blair* 69, 70 & 95.

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; also in Madagascar and (introduced?) into Timor (Map—Clayton *l. c.* map 7). In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

841 var. **pilosa** (Hochst.) Stapf in F.T.A. 9:324 (1918); Clayton, *op. cit.*, :97 (1969); Wickens, For. Bull. 14(N.S.):45 (1969); Clayton in F.W.T.A. ed. 2, 3:494 (1972).

Andropogon filipendulus Hochst. var. *pilosus* Hochst. in Flora 29:115 (1846).

DARFUR Jebel Marra, piedmont and massif, 1160–1920 m; savanna. *Pettet* J.30; *Blair* 45, 103 & 107; *Wickens* 2543, 2724 & 2804.

DISTRIBUTION Nigeria eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; also in southern Asia and Australia. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Palaeotropical.

Note: Differs from var. **filipendula** in racemes 2–4 awned per pair and the spikelets pubescent to villous, with white hairs.

842 **Hyparrhenia griffithii** Bor in Ind. For. Rec. (Bot.) 1:92 (1938); Clayton, Kew Bull. Add. Ser. 2, :84 (1969); Wickens, For. Bull. 14(N.S.):46 (1969).

DARFUR Jebel Marra, massif, 1350 m. *Blair* 59.

DISTRIBUTION Sudan Republic (Jebel Marra), Kenya and Zambia; also in Madagascar and India (Map—Clayton *l. c.* map 6 (1969)).

FLORISTIC CATEGORY Deccan Region (very localized in Assam) with scattered extensions into Madagascar and the Zambezian Domains.

843 **Hyparrhenia hirta** (L.) Stapf in F.T.A. 9:315 (1918); Broun & Massey, F.S. :450 (1929); Andr., F.P.S. 3:468 (1956); Clayton, Kew Bull. Add. Ser. 2, :75 (1969); Quézel, Dossier 5:139 (1969); Cuf., Enum. :1405 (1970); Clayton in F.W.T.A. ed. 2, 3:492 (1972).

Andropogon hirtus L., Sp. Pl. :1046 (1753).

DARFUR A conspicuous but only an occasional to frequent constituent of the grass flora, apparently restricted to the volcanic ash soils of the Jebel Marra massif, and the ash piedmont plains. Generally found on moist or shady sites from Nyertete, 1160 m; upwards to 2750 m. Flowering usually in August and September, but specimens can be found flowering during most months of the year along the banks of the irrigation canals or other permanently moist localities. It is the most heavily collected of all the plants in the Jebel Marra area.

Lynes 183; *Miss Steele* 19 & 32; *Pettet* J.40; *Jackson* 2601, 3329 & 2872; *Blair* 7, 37, 46, 74, 102, 190, 229, 234, 235, 238, 250, 289 & 356; *Wickens* 1170, 1232, 1253, 1261, 1263, 1272, 1704, 2202, 2420, 2483, 2508, 2553, 2627 & 2721; *Kassas* 481, 483, 540, 547a & 547b (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *borroh*.

DISTRIBUTION Niger (Air), Sudan Republic (Jebel Marra and the Red Sea Hills) to the Somali Republic southwards through E. Africa to the Cape; also the Mediterranean region eastwards to Pakistan, probably introduced into Australia and America (Map—Clayton *l. c.* map 6).

FLORISTIC CATEGORY Sudano-Zambezian, Mediterranean, Saharo-Sindian Regions and Iranian Domain.

844 **Hyparrhenia multiplex** (Hochst. ex A. Rich.) Anderss. ex Stapf in F.T.A. 9:374 (1918); Clayton, Kew Bull. Add. Ser. 2, :152 (1969); Wickens, For. Bull. 14(N.S.):45 (1969); Cuf., Enum. :1406 (1970).

Anthistiria multiplex Hochst. ex A. Rich., Tent. Fl. Abyss. 2:449 (1851).

Hyparrhenia multiplex var. *leiopoda* Stapf in F.T.A. 9:375 (1918).

DARFUR Jebel Marra massif, 1900–3100m; upland grassland. *Jackson* 2641 & 3354; *Blair* 350 & 378; *Wickens* 2368, 2470 & 2620; *Sahni* 437. A dwarf annual grass 5–35 cm. high, restricted to seepage zones and other moist sites from 1900–2300 m. It only becomes widely distributed at the higher altitudes, and even then only on the level land and not on the well drained hill slopes.

DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra) and Ethiopia (Map 192 and Clayton *l. c.* map 13).

FLORISTIC CATEGORY Ethiopian-montane.

845 **Hyparrhenia nyassae** (Rendle) Stapf in F.T.A. 9:313 (1918); Clayton, Kew Bull. Add. Ser. 2, :53 (1969); Wickens, For. Bull. 14(N.S.) :45 (1969); Clayton in F.W.T.A. ed. 2, 3:491 (1972).

Andropogon nyassae Rendle in Journ. Bot. 31:358 (1893).

Hyparrhenia vulpina Stapf in F.T.A. 9:310 (1918).

DARFUR Jebel Marra, piedmont and massif, 1160–2400 m; lowland plain, 1020 m; savanna and irrigated gardens. *Jackson* 2635; *Pettet* J.29 & J.36; *Blair* 25, 49, 163, 174 & 204; *Wickens* 979, 1389 & 1933. A caespitose perennial, normally with almost tomentose basal sheaths, occasionally only sparsely pubescent.

Blair 163 & 174 however have glabrous, apparently annual bases but seem to belong here as the copious rufous indumentum of the spikelets cannot be reconciled with any other species.

DISTRIBUTION Ghana to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal, Botswana and Angola; also Thailand and Vietnam (Map—Clayton *l. c.* map 3). In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Palaeotropical.

846 **Hyparrhenia pilgerana** C. E. Hubbard in Bull. Misc. Inf. Kew 1928:39 (1928), based on *Cymbopogon stolzii* Pilger; Clayton, Kew Bull. Add. Ser. 2, :115, fig. 27 (1969); Wickens, For. Bull. 14(N.S.) :46 (1969); Cuf., Enum. :1407 (1970).

Cymbopogon stolzii Pilger in Bot. Jahrb. 54:286 (1917), *non*

Hyparrhenia stolzii Stapf (1918).

DARFUR Jebel Marra, massif, 2400 m; upland grassland. *Jackson* 2628.

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia southwards through E. Africa to Natal (Map—Clayton *l. c.* map 8).

FLORISTIC CATEGORY Afroriental and Zambeian Domains.

847 **Hyparrhenia poecilotricha** (Hackel) Stapf in F.T.A. 9:309 (1918); Clayton, Kew Bull. Add. Ser. 2, :69 (1969); Wickens, For. Bull. 14(N.S.) :46 (1969); Clayton in F.W.T.A. ed. 2, 3:492 (1972).

Andropogon poecilotrichus Hackel in Bol. Soc. Brot. 3:138 (1885).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; fallow lands; *Blair* 65 & 185; *Wickens* 1872 & 2169.

DISTRIBUTION Guinée Republic to Cameroon eastwards to the Sudan Republic (southern provinces and on the Ethiopian border) and south through E. Africa to the Transvaal (Map—Clayton *l. c.* map 4 (1969)).

FLORISTIC CATEGORY Sudano-Zambezian Region.

848 **Hyparrhenia rudis** Stapf in F.T.A. 9:344 (1918); Clayton, Kew Bull. Add. Ser. 2, :128 (1969); Wickens, For. Bull. 14(N.S.) :46 (1969); Clayton in F.W.T.A. ed. 2, 3:494 (1972).

DARFUR Jebel Marra, piedmont and massif, 1160–1830 m; stream bank. *Harrison* 1947; *Jackson* 3294; *Pettet* J.37, J.46 & J.47; *Blair* 63, 180 & 181; *Wickens* 1457a & 2525.

DISTRIBUTION Ghana to the Cameroons eastwards to the Sudan Republic (Jebel Marra) and Ethiopia and south through E. Africa to the Transvaal; also in Madagascar (Map—Clayton *l. c.* map 10).

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

849 **Hyparrhenia rufa** (Nees) Stapf in F.T.A. 9:304 (1918); Broun & Massey, F.S. :450 (1929); Andr., F.P.S. 3:468, fig. 117 (1956); Clayton, Kew Bull. Add. Ser. 2, :60 (1969); Cuf., Enum. :1408 (1970); Clayton in F.W.T.A. ed. 2, 3:492, fig. 455 (1972). *Trachypogon rufus* Nees, Agrost. Bras. :345 (1829).

Hyparrhenia altissima Stapf in F.T.A. 9:307 (1918); Andr., F.P.S. 3:468 (1956).

H. rufa var. *major* (Rendle) Stapf in F.T.A. 9:307 (1918).

[*H. glabriuscula* sensu Wickens, For. Bull. 14(N.S.) :45 (1969), *non* (Hochst.) Stapf (1918).]

DARFUR Jebel Marra, piedmont and massif, 1070–1900 m; lowland plain 1020 m; fallow lands, savanna and upland grassland. *Jackson* 3286; *Blair* 64; *Wickens* 1046, 1108, 2267, 2268, 2553a, 2720, 2738, 2767, 2780 & 2790. Vernacular name: (Fur) *awees* or *tilosa*.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal; also in Madagascar and tropical America, probably introduced into Australia. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions and Neotropical.

850 **Hyparrhenia schimperi** (Hochst. ex A. Rich.) Anderss. ex Stapf in F.T.A. 9:341 (1918); Clayton, Kew Bull. Add. Ser. 2, :118 (1969); Wickens, For. Bull. 14(N.S.) :46 (1969); Cuf., Enum. :1409 (1970).

Andropogon schimperi Hochst. ex A. Rich., Tent. Fl. Abyss 2:466 (1851).

DARFUR Jebel Marra, massif, 1500 m; arable lands. *Pettet* s.n.

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia south through E. Africa to Mozambique and Natal; also in Madagascar (Map—Clayton *l. c.* map 9).

FLORISTIC CATEGORY Afroriental and Zambezian Domains and Madagascan Region.

851 **Hyparrhenia subplumosa** Stapf in F.T.A. 9:368 (1918); Clayton, Kew Bull. Add. Ser. 2, :164 (1969); Wickens, For. Bull. 14(N.S.) :46 (1969); Clayton in F.W.T.A. ed. 2, 3:496 (1972).

DARFUR Jebel Marra, massif, 2300 m; near Wadi Amer. *Jackson* 3381.

DISTRIBUTION Senegal to Cameroon eastwards to the Sudan Republic (Jebel Marra) with a few specimens in Tanzania, Zambia and Angola (Map—Clayton *l. c.* map 15).

FLORISTIC CATEGORY Sudanian Domain with Zambezian extension.

Note: The Jebel Marra record is of particular interest since it is the only *Hyparrhenia* recorded from there which has a W. African distribution.

852 **Hyparrhenia tamba** (Hochst. ex Steud.) Anderss. ex Stapf in F.T.A. 9:336 (1918); Clayton, Kew Bull. Add. Ser. 2, :126 (1969).

Andropogon tamba Hochst. ex Steud., Syn Pl. Glum. 1:385 (1854).

Hyparrhenia glauca Stent in Bothalia 1:251 (1923); Wickens, For. Bull. 14(N.S.) :45 (1969).

DARFUR Jebel Marra, massif, 1340–2300 m; savanna and upland grassland. *Jackson* 3870; *Blair* 47, 48, 230, 243 & 251.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and Kenya, also in Natal and the Transvaal (Map—Clayton *l. c.* map 10).

FLORISTIC CATEGORY Afroriental and Zambezian Domains.

853 **Hyparrhenia variabilis** Stapf in F.T.A. 9:334 (1918); Broun & Massey, F.S. :451 (1929); Andr., F.P.S. 3:471 (1956); Clayton, Kew Bull. Add. Ser. 2, :113 (1969); Cuf., Enum. :1409 (1970).

H. spectabilis Stapf in F.T.A. 9:338 (1918).

DARFUR Jebel Marra, massif, 1350 m; fallow lands and shady sites. *Wickens* 1181, 1567 & 2819; *Kassas* 139 (KHU & CAI, *n.v.*).

DISTRIBUTION Southern provinces of the Sudan Republic and Ethiopia southwards through E. Africa to the Transvaal; also in Madagascar and (introduced ?) Java. (Map—Clayton *l. c.* map 9).

FLORISTIC CATEGORY Afroriental and Zambezian Domains, and Madagascan Region.

854 **Imperata cylindrica** (L.) P. Beauv., Ess. Agrost. :165, 166 (1812); Stapf in F.T.A. 9:87 (1917); Cuf., Enum. :1362 (1969); Clayton in F.W.T.A. ed. 2, 3:464 (1972).

Lagurus cylindricus L., Syst. Nat. ed. 10, :878 (1759).

var. **africana** (Anderss.) C. E. Hubbard in Imp. Agr. Bur. Joint Publ. 7:10 (1944); Andr., F.P.S. 3:476, fig. 119 (1956); Clayton in *l. c.*, fig. 468 (1972).

Imperata arundinacea Cyr. var. *africana* Anderss. in Öfv. Svensk. Vet. Akad. Forh. 12:159 (1855).

I. cylindrica (L.) P. Beauv. subsp. *koenigii* (Retz.) Benth. ex Dur. & Schinz, Consp. Fl. Afr. 2:694 (1894).

DARFUR Jebel Marra, massif, 1800 m; lowland plain, 700 m; flood plain. *Blair* 312 & 324; *Wickens* 2021. Vernacular name: (Fur) *sulma*; (Arabic) *abu sicken*.

DISTRIBUTION Senegal to Cameroon eastwards to the Sudan Republic and south through E. Africa to the Cape; also in Madagascar. In the Sudan it occurs at Wadi Halfa and in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

855 **Leersia hexandra** Swartz, Prodr. Veg. Ind. Occ. :21 (1788); Broun & Massey, F.S. :484 (1929); Andr., F.P.S. 3:479, fig. 121 (1956); Launert in Senck. Biol. 46:141, figs. 5a-b, 19, 20, t.16 (1965); Cuf., Enum. :1305 (1968); Clayton, F.T.E.A. Gramin. 1:25, fig. 9/11 (1970) & in F.W.T.A. ed. 2, 3:367, fig. 422 (1972). DARFUR Jebel Marra, piedmont, 1160 m; marshy stream banks. *Blair* 212 & 341; *Wickens* 2176 & 2226.

DISTRIBUTION Gambia to Cameroon to Ethiopia and south through E. Africa to the Cape; widespread through the tropics. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Pantropical.

856 **Lophochloa phleoïdes** (Vill.) Reichenb., Fl. Germ. Excurs. :42 (1830).

Festuca phleoïdes Vill., Fl. Delph. :7 (1785).

Koeleria phleoïdes (Vill.) Pers., Syn. Pl. 1:97 (1805); C. E. Hubbard in F.T.A. 10:97 (1937); Andr., F.P.S. 3:477 (1956); Ozenda, Fl. Sahara :178 (1958).

DARFUR Jebel Marra, massif, 2150–2650 m; upland meadow and arable land. *Steele* 34; *Jackson* 3324, 3875 & 3889; *Blair* 307; *Wickens* 2643 & 2794; *Kassas* 701 (KHU & CAI!).

DISTRIBUTION Sudan Republic (Jebel Marra and Red Sea Hills), southern Europe, N. Africa and Central Sahara across Arabia to Central Asia and NW. India grass weed of cultivation (Map 193).

FLORISTIC CATEGORY Mediterranean, Saharo-Sindian, Irano-Turanian Regions.

857 **Loudetia annua** (Stapf) C. E. Hubbard in Bull. Misc. Inf. Kew 1934:429 (1934) & in F.T.A. 10:40 (1937); Andr., F.P.S. 3:486 (1956); Clayton in F.W.T.A. ed. 2, 3:417 (1972) & F.T.E.A. Gramin. :421 (1974).

Trichopteryx annua Stapf in Bull. Misc. Inf. Kew 1897:295 (1897); Broun & Massey, F.S. :470 (1929).

DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* 2564. DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and Uganda.

FLORISTIC CATEGORY Sudanian and Afriental Domains.

858 **Loudetia simplex** (Nees) C. E. Hubbard in Bull. Misc. Inf. Kew 1934:431 (1934) & in F.T.A. 10:25 (1937); Andr., F.P.S. 3:486 (1956); Cuf., Enum. :1239 (1969); Clayton in F.W.T.A. ed. 2, 3:419 (1972) & F.T.E.A. Gramin. :418, fig. 114 (1974).

Trichopteryx simplex Nees, Fl. Afr. Austr. :269 (1841).

Arundinella simplex (Nees) Robyns in Bull. I.F.A.N. 17:56 (1955).

DARFUR Jebel Marra, massif, 1900–2000 m; upland grassland.

Blair 194; *Wickens* 2137. Vernacular name: (Arabic) *keel*.

DISTRIBUTION Senegal to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Natal and the Transvaal; also in Madagascan Region.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

859 **Loudetia togoënsis** (Pilger) C. E. Hubbard in Bull. Misc.

Inf. Kew 1934:431 (1934) & in F.T.A. 10:51 (1937); Andr., F.P.S. 3:487 (1956); Clayton in F.W.T.A. ed. 2, 3:416 (1972).

Trichopteryx togoënsis Pilger in Engler, Bot. Jahrb. 34:128 (1904).

Arundinella togoënsis (Pilger) Roberty in Bull. I.F.A.N. sér. A, 17:56 (1955).

DARFUR Lowland plain, 1020 m; savanna. *Blair* 155; *Wickens* 1127 & 2055.

DISTRIBUTION Mauritania to Cameroon eastwards to the central provinces of the Sudan Republic.

FLORISTIC CATEGORY Sudanian Domain.

860 **Melinis ambigua** Hackel in Oestr. Bot. Zeit. 1901:462 (1901); Stapf & Hubbard in F.T.A. 9:921 (1930); Wickens, For. Bull. 14(N.S.) :46 (1969).

[*M. sp. aff. longicauda* sensu Wickens, For. Bull. 14(N.S.) :46 (1969), *non* (Mez) Mez ex Stapf & Hubbard (1930).]

DARFUR Jebel Marra, massif, 1500–2300 m; stony soils, arable lands and forestry plantations. *Jackson* 3323; *Pellet* J.27, J.33 & J.44; *Blair* 56, 108 & 188.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Kenya, Tanzania, Malawi, Zambia and Rhodesia.

FLORISTIC CATEGORY Afriental and Zambezian Domains.

861 **Melinis tenuinervis** Stapf in Bull. Misc. Inf. Kew 1922:310 (1922); Stapf & Hubbard in F.T.A. 9:929 (1930); Andr., F.P.S. 3:488 (1929).

[*M. sp. cf. pallida* sensu Wickens, For. Bull. 14(N.S.) :46 (1969), *non* Stapf & Hubbard (1926).]

DARFUR Jebel Marra, massif, 1350–1525 m; arable land, *Pellet* s.n. & J.41; *Kassas* 265 & 307 (both KHU & CAI, *n.v.*).

DISTRIBUTION Uplands of Sudan Republic (Jebel Marra, the Imatongs and Dongotoma Hills), E. Africa southwards to Natal (Map 194).

FLORISTIC CATEGORY Afriental and Zambezian Domains (partly Afro-montane).

862 **Microchloa indica** (L.f.) P. Beauv., Ess. Agrost. :13, pl. 20, fig. 8 (1812); Andr., F.P.S. 3:488 (1956); Launert in Senck. Biol. 47:292, fig. 11–12 (1966); Cuf., Enum. :1283 (1968) *pro parte*; Quézel, Dossier 5:139 (1969); Clayton in F.W.T.A. ed. 2, 3:403 (1972) & F.T.E.A. Gramin. :314, fig. 88/11, 12 (1974).

Nardus indica L.f., Suppl. :105 (1781).

Microchloa setacea (Roxb.) R. Br., Prodr. :208 (1810); Broun & Massey, F.S. :478 (1929), *nom superfl.*

DARFUR Lowland plain, 1020 m; waste places. *Wickens* 2358.

Vernacular name: (Fur) *keel*.

DISTRIBUTION Mali to Cameroon eastwards to the central provinces of the Sudan Republic (Ethiopia *vide* Cufodontis *l. c.*) and south through E. Africa to Mozambique, Rhodesia and Angola; widespread through the tropics of the Old and New Worlds.

FLORISTIC CATEGORY Pantropical.

863 **Microchloa kunthii** Desv., Opusc. :75 (1831); Launert in Senck. Biol. 47:297, fig. 1–10 (1966); Wickens, For. Bull. 14(N.S.) :46 (1969); Clayton in F.W.T.A. ed. 2, 3:403 (1972) & F.T.E.A. Gramin. :314, fig. 88/1–10 (1974).

M. abyssinica Hochst. ex A. Rich., Tent. Fl. Abyss. 2:404 (1851).

[*M. indica* sensu Cuf., Enum. :2283 (1968), *pro parte*.]

DARFUR Jebel Marra, piedmont and massif, 1160–2290 m; lowland plain 1280 m; savanna and upland grassland. *Blair* 22 & 386; *Wickens* 1912, 1962, 2463 & 2586. Vernacular name: (Fur) *koogirr*.

DISTRIBUTION Ghana to Cameroon eastwards to the Somali Republic and south through E. Africa to the Transvaal and SW. Africa; widespread through the tropics of the Old and New World. Only known in the Sudan from Darfur Province. Broun & Massey refer to *M. setacea* as a perennial grass from the Jur Ghattas (*Schweinfurth* 2359); this specimen however is in fact an annual and should be referred to *M. indica*.

FLORISTIC CATEGORY Pantropical.

Note: This pan-tropical genus of 4 species has recently been revised by Launert *l. c.* (1966). Two species, *M. indica* and *M. kunthii* occur in our area. They can usually be separated fairly easily because *M. indica* is an annual and *M. kunthii* a perennial. However, it is extremely difficult to distinguish between them with precociously flowering *M. kunthii* because there are no structural differences in the spikelets, and it is therefore necessary to use overall quantitative characters. The following key has been taken from Launert *l. c.*

- Plant annual, loosely caespitose. Inflorescence with rachis 0.6–0.9 (–1.1) mm wide; upper glume 1.6–2.5 (–2.7) mm long, 0.8–1.0 (–1.4) mm wide; anthers usually 0.3–0.5 (–0.7) mm long (in some south tropical African forms up to 1.6 mm long, but then the leaves up to 4.5 mm wide). *M. indica*
- Plant perennial, densely caespitose. Inflorescence with rachis 0.8–1.2 mm wide; upper glume (2.0–) 2.5–2.8 (–3.5) mm long, 0.7–1.2 (–1.4) mm wide; anthers (0.5–) 0.7–1.0 (–1.2) mm long. . . . *M. kunthii*

M. indica is widely distributed throughout the tropics and subtropics of the world. It is usually found as a pioneer species on disturbed soil. *M. kunthii* has a similar distributional range but frequents more permanent habitats. In the Sudan I have only seen specimens from the Jebel Marra area where it frequents gallery forests, savanna woodland and upland meadow.

864 **Oplismenus hirtellus** (L.) P. Beauv., Ess. Agrost. :54, 170 (1812); Stapf in F.T.A. 9:631 (1920); Andr., F.P.S. 3:493 (1956); Cuf., Enum. :1326 (1969); Clayton in F.W.T.A. ed. 2, 3:437 (1972).

Panicum hirtellum L., Syst. Nat. ed. 10, 2:870 (1759).

DARFUR Jebel Marra, massif, 1525–1765 m; stream bank. *Pettet* J.38; *Blair* 205; *Wickens* 988 & 1578.

DISTRIBUTION Senegal across to Ethiopia and south to the Cape; also in tropical Asia and America. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Pantropical.

865 **Oryza longistaminata** Chev. & Roehrich in Compt. Rend. Acad. Sci. 159:561 (1914); Clayton, F.T.E.A. Gramin. :130 (1970) & in F.W.T.A. ed. 2, 3:365 (1972).

[*O. barthii* sensu Broun & Massey, F.S. :483 (1929); Andr., F.P.S. 3:493 (1956), et mult. auct., non A. Chev. (1911).]

DARFUR Lowland plain, 600 m; swamp margin. *Blair* 202.

DISTRIBUTION Senegal to Cameroon eastwards to the Sudan Republic and south through E. Africa to the Transvaal and SW. Africa; also in Madagascar.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

866 **Oxytenanthera abyssinica** (A. Rich.) Munro in Trans. Linn. Soc. 26:127 (1868); Broun & Massey, F.S. :485 (1929); Andr., F.P.S. 3:494 (1956); Sahni, Trees N. Sudan :118, fig. 50 (1968); Clayton, F.T.E.A. Gramin. :111, fig. 3 (1970); Cuf., Enum. :1413 (1970); Clayton in F.W.T.A. ed. 2, 3:360, fig. 417 (1972). *Bambusa abyssinica* A. Rich., Tent. Fl. Abyss. 2:439 (1851). DARFUR Jebel Marra, foothills, 1125 m; lowland plain, 735 m; stream bank. *Blair* 336; *Wickens* 2231 & 2925. Also observed bordering the gullies in the granite hills above Farni Karni and along the Wadi Saiei near Habila. Vernacular name: (Fur) *beida*; (Arabic) *ganna*. The canes are used for spears, buildings, furniture etc. canes with a portion of the rootstock are cut for walking sticks. The seeds are harvested in times of famine for flour and brewing. The spiky seeds are reputed to cause wounds that are difficult to heal.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Mozambique, Rhodesia and Angola. In the Sudan it occurs in the Nuba Mountains and southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian Region.

867 **Panicum callosum** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:374 (1851); Stapf in F.T.A. 9:696 (1920); Broun & Massey, F.S. :462 (1929); Andr., F.P.S. 3:501 (1956).

DARFUR Jebel Marra, foothills, 1160 m; *Boswellia papyrifera* woodland. *Wickens* 2571.

DISTRIBUTION Sudan Republic (Jebel Marra, Nuba Mountains and Kassala province) and Ethiopia.

FLORISTIC CATEGORY Afrioriental Domain with Sudanian extensions.

868 **Panicum dregeanum** Nees, Fl. Afr. Austr. :42 (1841); Stapf in F.T.A. 9:684 (1920); Broun & Massey, F.S. :462 (1929); Andr., F.P.S. 3:501 (1956); Clayton in F.W.T.A. ed. 2, 3:432 (1972).

DARFUR Jebel Marra, massif, 1340–1525 m; arable land. *Pettet* J.32; *Blair* 227 & 228.

DISTRIBUTION Senegal to Gabon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Natal and the Transvaal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

869 **Panicum fluviicola** Steud., Syn. Pl. Glum. :189 (1854); Stapf in F.T.A. 9:689 (1920); Wickens, For. Bull. 14(N.S.) :46 (1969); Clayton in F.W.T.A. ed. 2, 3:432 (1972).

P. aphanoneurum Stapf in F.T.A. 9:687 (1920); Broun & Massey, F.S. :462 (1929); Andr., F.P.S. 3:501 (1956).

[*P. sp. cf. P. grandiflorum* sensu Wickens, For. Bull. 14(N.S.) :47 (1969), non Stapf (1920).]

DARFUR Jebel Marra, piedmont 1160 m; *Blair* 169.

DISTRIBUTION Mauritania to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Natal and the Transvaal.

FLORISTIC CATEGORY Sudano-Zambezian Region.

870 **Panicum infestum** Anderss. in Peters, Reise. Mossamb. Bot. 2:546 (1864); Stapf in F.T.A. 9:658 (1920).

DARFUR Jebel Marra, piedmont, 1160 m; stream bank. *Blair* 340; *Wickens* 2225.

DISTRIBUTION Sudan Republic (Darfur) and from southern Somali Republic southwards through E. Africa to the Transvaal.

FLORISTIC CATEGORY Afrioriental and Zambezian Domains.

871 **Panicum laetum** Kunth, R v. Gram. 2:399, t.113 (1831); Stapf in F.T.A. 9:700 (1920); Wickens, For. Bull. 14(N.S.) :47 (1969), excl. specim. *Wickens* 2104; Clayton in F.W.T.A. ed. 2, 3:434 (1972).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; flood plain and stream banks. *Blair* 332; *Wickens* 2078 & 2119.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia. Widespread through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sahelian and Afrioriental Domains.

872 **Panicum maximum** Jacq., Ic. Pl. Rar. 1:2, t.13 (1781). Stapf in F.T.A. 9:655 (1920); Broun & Massey, F.S. :461 (1929); Andr., F.P.S. 3:497, fig. 127 (1956); Cuf., Enum. :1308 (1969); Clayton in F.W.T.A. ed. 2, 3:429, fig. 440 (1972).

DARFUR Lowland plain, 1020 m; arable land. *Wickens* 2301.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; introduced into many tropical and subtropical countries. Widely distributed through the southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

873 **Panicum porphyrrhizos** Steud., Syn. Pl. Glum. :172 (1854); Stapf in F.T.A. 9:712 (1920); Broun & Massey, F.S. :463 (1929); Andr., F.P.S. 3:504 (1956); Clayton in F.W.T.A. ed. 2, 3:434 (1972).

[*P. laetum* sensu Wickens, For. Bull. 14(N.S.) :47 (1969), pro specim. *Wickens* 2104.]

DARFUR Jebel Marra, piedmont 1160 m; clay pan. *Blair* 109 & 119; *Wickens* 2104, 2197 & 2198.

DISTRIBUTION Senegal to Niger Republic eastwards to Ethiopia and south through E. Africa to Zambia. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian Region.

Note: This species intergrades with both *P. subalbidum* and *P. coloratum*; its status will remain unclear until material from southern Africa has been properly revised.

874 ***Panicum pusillum* Hook. f.** in Journ. Linn. Soc. Bot. 7:227 (1864); Stapf in F.T.A. 9:725 (1920); Andr. F.P.S. 3:505 (1956); Cuf., Enum. :1309 (1969); Clayton in F.W.T.A. ed. 2, 3:433 (1972).
DARFUR Jebel Marra, massif 1850–2750 m; upland meadow and fallow lands. *Jackson* 4076; *Blair* 268 & 362; *Wickens* 2474 & 2479; *Kassas* 311 (KHU & CAI!).

DISTRIBUTION Uplands of Sierra Leone (Loma Mtn.), Nigeria (Plateau), Cameroon Mtn., Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and E. Africa (Map 195).

FLORISTIC CATEGORY Afro-montane.

875 ***Panicum subalbidum* Kunth**, Rév. Gram. :397, t.112 (1831); Cuf., Enum. :1310 (1969); Wickens, For. Bull. 14(N.S.) :47 (1969); Clayton in F.W.T.A. ed. 2, 3:434 (1972).
P. glabrescens Steud., Syn. Pl. Glum. 1:171 (1854); Stapf in F.T.A. 9:736 (1920); Andr., F.P.S. 3:505 (1956).
P. longijubatum Stapf in F.T.A. 9:718 (1920).
DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 700–1020 m; areas of impeded drainage. *Blair* 313 & 338; *Wickens* 2013, 2194 & 2303.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through Uganda, Kenya and Tanzania; also in Madagascar. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Madagascan Regions.

876 ***Paspalum scrobiculatum* L.**, Mant. Pl. 1:29 (1767); Clayton in Kew. Bull. 30:101 (1975).
Paspalum orbiculare Forst., Flor. Insul. Austr. Prodr. :7 (1786); Clayton in F.W.T.A. ed. 2, 3:446, fig. 443 (1972).
P. commersonii Lam., Tab. Encycl. Méth. Bot. 1:175, t.43, fig. 1 (1791); Andr., F.P.S. 3:509, fig. 131 (1956); Cuf., Enum. :1335 (1969).
P. polystachyum R. Br., Prodr. Fl. Nov. Holl. :188 (1810); Andr., F.P.S. 3:509 (1956); Clayton in F.W.T.A. ed. 2, 3:446 (1972).
P. scrobiculatum L. var. *commersonii* (Lam.) Stapf in F.T.A. 9:573 (1919); Broun & Massey, F.S. :457 (1929).
DARFUR Jebel Marra, piedmont and massif, 1160–1980 m; lowland plain 1020 m; marshy places. *Blair* 80 & 210; *Wickens* 1067, 1451, 1877 & 2747.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; widespread through the tropics and subtropics to the Old World. Widespread through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

877 ***Pennisetum fallax* (Fig. & DeNot.) Stapf & Hubbard** in Bull. Misc. Inf. Kew 1933:270 (1933) & in F.T.A. 9:1019 (1934); Andr., F.P.S. 3:514 (1956); Cuf., Enum. :1344 (1969); Wickens, For. Bull. 14(N.S.) :47 (1969); Clayton in F.W.T.A. ed. 2, 3:463 (1972).
Penicillaria fallax Fig. & DeNot in Mem. Acc. Torin. II, 14:371 (1854).
Pennisetum ochrops Stapf & Hubbard in *op. cit.* :284 (1933) & in F.T.A. 9:1021 (1934); Andr., F.P.S. 3:516 (1956).
DARFUR Lowland plain, 890–1100 m; *Acacia albida* woodland. *Lynes* 509; *Jackson* 3272; *Blair* 200 & 201; *Wickens* 1122 & 2777.
DISTRIBUTION Mauritania, Senegal and N. Nigeria eastwards to Ethiopia. Widely distributed in the Sudan through Kordofan and Darfur provinces.

FLORISTIC CATEGORY Sahelian and Afrioriental Domains.

878 ***Pennisetum giganteum* A. Rich.**, Tent. Fl. Abyss. 2:382 (1851); Stapf & Hubbard in F.T.A. 9:979 (1934); Andr., F.P.S. 3:512 (1956); Cuf., Enum. :1344 (1969); Clayton in F.W.T.A. ed. 2, 3:461 (1972).
P. logoense Mez in Engler, Bot. Jahrb. 57:191 (1921); Stapf & Hubbard in F.T.A. 9:988 (1934).

[*Pennisetum quartinianum* sensu Wickens, For. Bull. 14(N.S.) :47 (1969), *non* A. Rich (1851).]

DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; stream banks. *Jackson* 2548 & 3300; *Blair* 164; *Pellet* J.26; *Blair* 164, 207, 247 & 260; *Wickens* 976, 1010 & 1062.

DISTRIBUTION Guinée Republic, Togo, Nigeria, Sudan Republic (Jebel Marra and the Imatongs), Ethiopia, Uganda and Kenya.

FLORISTIC CATEGORY Sudanian and Afrioriental Domains.

879 ***Pennisetum glabrum* Steud.**, Syn. Pl. Glum. 1:104 (1854); Stapf & Hubbard in F.T.A. 9:995 (1934); Andr., F.P.S. 3:512 (1956); Cuf., Enum. :1344 (1969); Clayton in F.W.T.A. ed. 2, 3:463 (1972).

DARFUR Jebel Marra, massif, 1900–3000 m; moist sites. *Dandy* 103 (BM!); *Jackson* 2617 & 3352; *Blair* 249, 285, 295 & 302; *Wickens* 2602 & 2666; *Kassas* 461:6 (KHU & CAI, *n.v.*).

DISTRIBUTION Uplands of N. Nigeria, Sudan Republic (Jebel Marra) and Ethiopia southwards through E. Africa to Malawi and Zambia; also in the Yemen (Map 196).

FLORISTIC CATEGORY Afro-montane.

880 ***Pennisetum gracilescens* Hochst.** in Flora 38:199 (1855); Stapf & Hubbard in F.T.A. 9:1011 (1934); Andr., F.P.S. 3:513 (1956); Cuf., Enum. :1145 (1969); Quézel, Dossier 5:140 (1969). [P. sp. near *polystachion* sensu Broun & Massey, F.S. :467 (1929) *non* (L.) Schultes (1824).]

DARFUR Jebel Marra, massif, 1350–2750 m; upland grassland. *Lynes* 175; *Blair* 245; *Kassas* 174 (KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia (Map 197).

FLORISTIC CATEGORY Ethiopian-montane.

881 ***Pennisetum pedicellatum* Trin.** in Mém. Acad. Sci. Pétersb. VI, 3:184 (1834); Stapf & Hubbard in F.T.A. 9:1065 (1934); Broun & Massey, F.S. :467 (1929); Andr., F.P.S. 3:517 (1956); Cuf., Enum. :1347 (1969); Quézel, Dossier 5:140 (1969); Clayton in F.W.T.A. ed. 2, 3:460 (1972).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1020 m; fallow lands and hill savanna. *Lynes* 629; *Robertson* 5; *Pellet* J.6 & J.15; *Blair* 54, 93 & 165; *Wickens* 2493, 2559, 2574 & 2716. Vernacular name: (Fur) *borroh*; (Arabic) *marhabeib*.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia; also in India. Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afrioriental Domains and Saharo-Sindian and Deccan Regions.

882 ***Pennisetum polystachion* (L.) Schultes**, Syst. Veg. 2, Mant. :146 (1824); Stapf & Hubbard in F.T.A. 9:1057 (1934); Broun & Massey, F.S. :467 (1929); Andr., F.P.S. 3:517, fig. 133 (1956); Cuf., Enum. :1347 (1969); Clayton in F.W.T.A. ed. 2, 3:460 (1972).

Panicum polystachion L., Syst. Veg. Nat. ed. 10, 2:870 (1759).

DARFUR Jebel Marra, piedmont and massif, 1160–1830 m; wayside, arable and fallow lands. *Blair* 92, 94, 115, 166, 167, 168; *Wickens* 1886, 2270 & 2531; *Kassas* 354 & 360:10 (KHU & CAI!).

DISTRIBUTION Senegal to Cameroon eastwards to the central and southern provinces of the Sudan Republic (Ethiopia *fide* Cufodontis) and south through E. Africa to Mozambique, Rhodesia and Angola; widespread through the tropics of the Old World.

FLORISTIC CATEGORY Palaeotropical.

883 ***Pennisetum ramosum*** (Hochst.) Schweinf., Beitr. Fl. Aethiop. :301 (1867); Stapf & Hubbard in F.T.A. 9:976 (1934); Andr., F.P.S. 3:512 (1956); Cuf., Enum. :1348 (1969); Clayton in F.W.T.A. ed. 2, 3:460 (1972).
Gymnothrix ramosa Hochst. in Flora 27:252 (1844).
Pennisetum ovale Rupr. ex Steud., Syn. Pl. Glum. 1:104 (1854); Broun & Massey, F.S. :468 (1929).
 DARFUR Jebel Marra, piedmont and massif, 1160–2290 m; lowland plain, 1000 m; clay soils. *Robertson* 3; *Blair* 222; *Kassas* 528 (KHU & CAI, *n.v.*).
 DISTRIBUTION Nigeria and Cameroon eastwards to Ethiopia and south through Uganda, Kenya and Tanzania. Widely distributed through the Sudan.
 FLORISTIC CATEGORY Sudano-Zambezian Region.

884 ***Pennisetum stenorrhachis*** Stapf & Hubbard in Bull. Misc. Inf. Kew 1933:270 (1933) & in F.T.A. 9:986 (1934); Andr., F.P.S. 3:512 (1956); Cuf., Enum. :1351 (1969).
 DARFUR Jebel Marra massif, 1340–2290 m; stream bank. *Dandy* 62 (BM!); *Wickens* 2527; *Kassas* 525 (KHU & CAI, *n.v.*).
 DISTRIBUTION Sudan Republic. (Also occurs in Kassala province *vide* Stapf & Hubbard *l. c.*) ?Ethiopia and Uganda.
 FLORISTIC CATEGORY Afriental Domain.

885 ***Pennisetum violaceum*** (Lam.) L. Rich. in Pers., Syn. Pl. Glum. 1:72 (1805); Stapf & Hubbard in F.T.A. 9:1027 (1934); Wickens, For. Bull. 14(N.S.) :47 (1969); Clayton in F.W.T.A. ed. 2, 3:463 (1972).
Panicum violaceum Lam., Ill. Gen. 1:169 (1791).
Pennisetum mollissimum Hochst. in Flora 27:253 (1844); Stapf & Hubbard in F.T.A. 9:1022 (1934); Broun & Massey, F.S. :469 (1929); Andr., F.P.S. 3:516 (1956).
P. darfuricum Stapf & Hubbard in Bull. Misc. Inf. Kew 1933:283 (1933) & in F.T.A. 9:1020 (1934); Andr., F.P.S. 3:516 (1956).
 DARFUR Jebel Marra piedmont 1170 m; lowland plain 1050 m; river bank and rock crevices. *Wickens* 2319, 2331, 2547, 2759 & 2761.
 DISTRIBUTION Mauritania to Cameroon eastwards to the northern and central provinces of the Sudan Republic.
 FLORISTIC CATEGORY Sahelian Domain.

886 ***Pentaschistis pictigluma*** (Steud.) Pilger in Not. Bot. Gart. Berlin 9:517 (1926); Hubbard in F.T.A. 10:133 (1937); Cuf., Enum. :1234 (1968); Wickens, For. Bull. 14(N.S.) :47 (1969) & in Kew Bull. 26:141 (1971); Clayton in F.W.T.A. ed. 2, 3:374 (1972).
Aira pictigluma Steud., Syn. Pl. Glum. 1:221, 423 (1854).
Pentaschistis mannii Stapf ex C. E. Hubbard in Bull. Misc. Inf. Kew 1936:501 (1936) & in F.T.A. 10:134 (1937).
 DARFUR Jebel Marra, massif, 2750–3070 m; upland meadow. *Jackson* 3338; *Blair* 365; *Wickens* 2476.
 DISTRIBUTION Cameroon Mtns., Sudan Republic (Jebel Marra), Ethiopia, Uganda and Tanzania (Map 198).
 FLORISTIC CATEGORY Afro-montane.
 Note: For further taxonomic discussion see Wickens, *l. c.* (1971).

887 ***Phaenanthoecium köstlinii*** Hochst. ex A. Rich.) C. E. Hubbard in Bull. Misc. Inf. Kew 1936:330 (1936) & in F.T.A. 10:143 (1937); Andr., F.P.S. 3:519 (1956); Cuf., Enum. :1235 (1968).
Danthonia köstlinii Hochst. ex A. Rich., Tent. Fl. Abyss. 2:421 (1851).
D. sp., Norman in Journ. Bot. 62:135 (1924).
 DARFUR Jebel Marra, massif (Abwo waterfall), 2500 m; hanging down rock faces by cascade, just out of reach of spray. *Lynes* 44 (BM!).
 DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia (Map 199).
 FLORISTIC CATEGORY Ethiopian-montane.

888 ***Phragmites karka*** (Retz.) Trin. ex Steud., Nom. Bot. ed. 2, 2:324 (1841); Cuf., Enum. :1236 (1968); Wickens, For. Bull. 14(N.S.) :47 (1969); Clayton, F.T.E.A. Gramin. :118 (1970) & in F.W.T.A. ed. 2, 3:374 (1972).
Arundo karka Retz., Obs. Bot. 4:21 (1786).
 [Phragmites communis sensu Wickens, For. Bull. 14(N.S.) :47 (1969). *non* Trin. (1820).]
 DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1000–1020 m; marshy ground. *Jackson* 2518; *Robertson* 28; *Blair* 218; *Wickens* 1053 & 2498.
 DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic, Uganda and Kenya; also in tropical Asia, northern Australia and Polynesia. Widespread through the Sudan.
 FLORISTIC CATEGORY Palaeotropical.

889 ***Poa bulbosa*** L., Sp. Pl. :70 (1953).
 var. ***vivipara*** Koeler, Descr. Gram. :189 (1802); Wickens, For. Bull. 14(N.S.) :47 (1969).
 DARFUR Jebel Marra, massif, 2550–3070 m; upland meadow. *Jackson* 2643a; *Blair* 355; *Wickens* 2376, 2397, 2484, 2668a & 2669.
 DISTRIBUTION Sudan Republic (Jebel Marra); central Europe and Mediterranean region eastwards into central Asia and Pakistan, introduced into America (Map 200).
 FLORISTIC CATEGORY Palaeartic (Irano-Turanian with numerous extensions).

890 ***Poa leptoclada*** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:422 (1851); Andr., F.P.S. 3:521 (1956); Hedberg, Symb. Bot. Upsal. 15, 1:39 (1957); Cuf., Enum. :1208 (1968); Clayton, F.T.E.A. Gramin. :47 (1970) & in F.W.T.A. ed. 2, 3:369 (1972).
 DARFUR Jebel Marra massif 2450–2750 m; upland grassland. *Blair* 308, 357 & 361; *Wickens* 2480 & 2668b.
 DISTRIBUTION Uplands of Cameroon, Sudan Republic (Jebel Marra and the Imatongs) and Ethiopia southwards through E. Africa to Rhodesia (Map 201).
 FLORISTIC CATEGORY Afro-montane.

891 ***Pogonarthria squarrosa*** (Licht. ex Roem. & Schultes) Pilger in Not. Bot. Gart. Berlin 5:149 (1910); Launert in Senck. Biol. 47:303 (1966); Quézel, Dossier 5:140 (1969); Wickens, For. Bull. 14(N.S.) :47 (1969); Clayton in F.W.T.A. ed. 2, 3:397 (1972) & F.T.E.A. Gramin. :267, fig. 73 (1974).
Poa squarrosa Licht. ex Roem. & Schultes, Syst. Veg. 2:553 (1817).
 DARFUR Jebel Marra, piedmont and massif, 1160–1550 m; lowland plain, 1030 m; shady, damp sites, arable lands and wayside. *Jackson* 2554, 3871 & 4045; *Robertson* 16; *Pettet* J.16; *Blair* 21 & 158; *Wickens* 2163 & 2357.
 DISTRIBUTION Ghana to Cameroon eastwards to the Sudan Republic (Jebel Marra) and Ethiopia and south through E. Africa to the Cape.
 FLORISTIC CATEGORY Sudano-Zambezian Region.
 Note: This African genus of 4 species has recently been revised by Launert *l. c.*
P. squarrosa is an extremely variable species found mostly as a weed in disturbed places. In the Sudan it is apparently restricted to the Jebel Marra massif and its immediate environs, where it usually occurs on volcanic soils, although it may occasionally be found on stony basement complex soils.

892 ***Polypogon monspeliensis*** (L.) Desf., Fl. Atlant. 1:67 (1798); Hubbard in F.T.A. 10:160 (1937); Broun & Massey, F.S. :471 (1929); Andr., F.P.S. 3:521 (1956); Cuf., Enum. :1231 (1968); Clayton, F.T.E.A. Gramin. :100, fig. 33 (1970) & in F.W.T.A. ed. 2, 3:374 (1972).
Alopecurus monspeliensis L., Sp. Pl. :61 (1753).
 DARFUR Jebel Marra, piedmont and massif, 1160–2300 m; stream banks and other moist sites. *Steele* 2 & 38; *Blair* 75, 216 & 254; *Wickens* 1079, 1242 & 2659; *Kassas* 715 (KHU & CAI, *n.v.*).

DISTRIBUTION Niger (Air), Sudan Republic and Ethiopia southwards through E. Africa to the Cape; also from southern Europe and North Africa eastwards through Asia to Japan, introduced into the Americas and Australia. The only other specimen seen for the Sudan is from New Dongola.
FLORISTIC CATEGORY Subcosmopolitan.

893 **Rhynchelytrum grandiflorum** Hochst. in Flora 27:249 (1844); Stapf & Hubbard in F.T.A. 9:874 (1930); Andr., F.P.S. 3:522 (1956); Cuf., Enum. :1357 (1969).

[*Tricholaena rosea* sensu Broun & Massey, F.S. :466 (1929), pro parte, *non* Nees (1835).]

DARFUR Jebel Marra, piedmont, 1160–1170 m; lowland plain, 1020 m; savanna. Blair 198; Wickens 2098 & 2558. Vernacular name: (Fur) *bagwoorq*.

DISTRIBUTION Scattered through the north-eastern provinces of the Sudan Republic, Ethiopia, Tanzania, Mozambique and Angola.
FLORISTIC CATEGORY Afriental and Zambezan Domains.

894 **Rhynchelytrum longisetum** (Hochst. ex A. Rich.) Stapf & Hubbard in F.T.A. 9:902 (1930); Wickens, For. Bull. 14(N.S.) :48 (1969).

Tricholaena longiseta Hochst. ex A. Rich., Tent. Fl. Abyss. 2:446 (1851).

DARFUR Jebel Marra, piedmont, 1160 m; open clearing in gallery forest. Wickens 1918.

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia (Map 202).

FLORISTIC CATEGORY Ethiopian-?montane.

Note: Further gatherings of this little known species are required.

895 **Rhynchelytrum minutiflorum** (Rendle) Stapf & Hubbard in F.T.A. 9:903 (1930).

Tricholaena minutiflora Rendle in Hiern, Cat. Welw. Afr. Pl. 2:198 (1899).

var. **melinioides** (Stent) Stapf & Hubbard in F.T.A. 9:904 (1930); Wickens, For. Bull. 14(N.S.) :48 (1969).

T. melinioides Stent in Kew Bull. 1952:364 (1925).

DARFUR Jebel Marra, massif, 1850 m; basalt clay depression. Wickens 2820.

DISTRIBUTION Sudan Republic (Jebel Marra), Malawi, Mozambique, Zambia, Rhodesia and Angola.

FLORISTIC CATEGORY Zambezan Domain.

896 **Rhynchelytrum repens** (Willd.) C. E. Hubbard in Bull.

Misc. Inf. Kew 1934:110 (1934); Andr., F.P.S. 3:522 (1956); Cuf., Enum. :1357 (1969); Quézel, Dossier 5:140 (1969);

Clayton in F.W.T.A. ed. 2, 3:454 (1972).

Saccharum repens Willd., Sp. Pl. 1:322 (1798).

Tricholaena rosea Nees, Ind. Sem. Hort. Vratisl. (1835); Broun & Massey, F.S. :466 (1929), pro parte.

T. sphacelata Benth. in Hook., Niger Fl. :559 (1849); Broun & Massey, F.S. :466 (1929).

Rhynchelytrum roseum (Nees) Stapf & Hubbard ex Bews, The Worlds Grasses :223 (1929) & in F.T.A. 9:880 (1930).

DARFUR Jebel Marra, piedmont and massif, 1160–2450 m; lowland plain, 1020 m; arable land, stream banks. Steele 24; Dandy 66 & 84 (both BM!); Pettet J.9; Blair 27 & 376; Wickens 1167, 1419, 2348 & 2436; Kassas 590 & 887 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *julmad* or *salmad*.

DISTRIBUTION Sierra Leone to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; introduced into most warm countries. Widely distributed in the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan Region.

897 **Rhynchelytrum villosum** (Parl.) Chiov. in Ann. Ist. Bot.

Roma 8:310 (1908); Stapf & Hubbard in F.T.A. 9:875 (1930); Andr., F.P.S. 3:522 (1956); Cuf., Enum. :1358 (1969); Quézel, Dossier 5:140 (1969); Clayton in F.W.T.A. ed. 2, 3:454 (1972).

Monachyrion villosum Parl. in Hook., Niger Fl. :191 (1849).

DARFUR Jebel Marra, piedmont and massif, 1160–1770 m; rock crevices and forestry plantation. Jackson 3289; Pettet J.21; Wickens 1911 & 1918.

DISTRIBUTION Ghana and Niger and from the central and southern provinces of the Sudan Republic, Ethiopia and Somali Republic southwards through E. Africa to the Cape; also in Madagascar, Arabia and India.

FLORISTIC CATEGORY Saharo-Zambezan, Saharo-Sindian, Madagascar and Deccan Regions.

898 **Rottboellia exaltata** L. f., Nov. Gram. Gen. :37, t.1 (1779) & Suppl. Pl. :114 (1781); Stapf in F.T.A. 9:73 (1917); Broun & Massey, F.S. :441 (1929); Andr., F.P.S. 3:523, fig. 135 (1956); Cuf., Enum. :1368 (1969); Quézel, Dossier 5:140 (1969); Clayton in F.W.T.A. ed. 2, 3:506, fig. 461 (1972).

DARFUR Jebel Marra, piedmont and massif, 1160–1780 m; lowland plain, 1020 m; arable lands. Robertson 11; Blair 746; Wickens 2491 & 2710.

DISTRIBUTION Gambia to Cameroon eastwards to the Somali Republic and south through E. Africa to the Transvaal and SW. Africa; widespread in the tropics of the Old and New Worlds. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Panropical.

899 **Saccharum spontaneum** L., Mant. Alt. :183 (1771); Clayton in F.W.T.A. ed. 2, 3:466 (1972).

subsp. **aegyptiacum** (Willd.) Hackel in DC., Monogr. Phan.

6:115 (1889); Stapf in F.T.A. 9:95 (1917); Broun & Massey, F.S. :442 (1929); Andr., F.P.S. 3:352 (1956); Wickens, For. Bull. 14(N.S.) :48 (1969); Clayton l. c. (1972).

S. aegyptiacum Willd., Enum. Pl. :82 (1809).

DARFUR Jebel Marra, piedmont and massif, 1160–2290 m; lowland plain, 1000–1100 m; marshy river banks. Lynes 515 (BM!); Dandy 197 (BM!); Jackson 2520; Blair 217; Wickens 1061, 1811 & 2228.

DISTRIBUTION Ghana to Cameroon eastwards to Ethiopia and south through E. Africa to Malawi and Zambia; also from Egypt to Syria. Widely distributed in the Sudan along the Nile and its tributaries.

FLORISTIC CATEGORY Sudano-Zambezan and Eastern Mediterranean Regions.

900 **Schizachyrium brevifolium** (Swartz) Nees ex Büse in Miq., Pl. Junghn. :359 (1854); Stapf in F.T.A. 9:187 (1917); Andr., F.P.S. 3:527 (1956); Cuf., Enum. :1400 (1970); Clayton in F.W.T.A. ed. 2, 3:478 (1972).

Andropogon brevifolius Swartz, Prodr. Veg. Ind. Occ. :26 (1788).

DARFUR Jebel Marra, piedmont, 1160 m. Blair 176.

DISTRIBUTION Guinée Republic to Cameroon eastwards to Ethiopia and south through E. Africa to the Transvaal; widespread in the tropics of the world. In the Sudan it is found in the southern provinces.

FLORISTIC CATEGORY Panropical.

901 **Schizachyrium exile** (Hochst.) Pilger in Engler, Bot. Jahrb. 54:284 (1917); Stapf in F.T.A. 9:191 (1917); Broun & Massey, F.S. :448 (1929); Andr., F.P.S. 3:529, fig. 136 (1956); Quézel, Dossier 5:140 (1969); Cuf., Enum. :1400 (1970); Clayton in F.W.T.A. ed. 2, 3:479 (1972).

Andropogon exilis Hochst. in Flora 27:241 (1844).

DARFUR Jebel Marra, piedmont, 1170 m; lowland plain, 1020 m; savanna and fallow lands. Blair 156; Wickens 2561 & 2739.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and from Zambia to the Transvaal and SW. Africa; widespread through the tropics of the Old World. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Palaeotropical.

902 **Schoenefeldia gracilis** Kunth, Rév. Gram. 1:283, t.53 (1830); Broun & Massey, F.S. :478 (1929); Andr., F.P.S. 3:530, fig. 137 (1956); Cuf., Enum. :1285 (1968); Quézel, Dossier 5:140 (1969); Clayton in F.W.T.A. ed. 2, 3:402 (1972).

DARFUR Lowland plain, 1020 m; stony soils. *Blair* 162; *Wickens* 2752. Vernacular name: (Arabic) *gaw*.

DISTRIBUTION Mauritania to Nigeria eastwards to Ethiopia; also from Egypt, Baluchistan and Pakistan (Map 203). Widespread through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Saharo-Sindian Region and Sahelian Domain.

903 *Setaria ischaemoides* *Forsk.*, *Fl. Aegypt.-Arab.* :178 (1775); *Stapf* in *F.T.A.* 9:37 (1917); *Broun & Massey, F.S.* :440 (1929); *Andr., F.P.S.* 3:531 (1956); *Cuf., Enum.* :1365 (1969); *Quézel, Dossier* 5:140 (1969), *Clayton in F.W.T.A. ed. 2, 3:476* (1972).

S. kotschyi *Hochst.* in *Flora* 27:247 (1844).

S. kotschyi var. *schangulicum* *Hochst.* in *Flora* 27:248 (1844).

DARFUR Jebel Marra, foothills, 1500 m; lowland plain, 1030 m; basalt clay and shallow, stony soils. *Wickens* 2768 & s.n.

DISTRIBUTION Mali to the Central African Republic eastwards to the Somali Republic and south through E. Africa to Rhodesia and SW. Africa; also in Arabia and India. Widespread through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

904 *Setaria anceps* *Stapf ex Massey*, *Sudan Grasses* :33 (1926); *Stapf & Hubbard in F.T.A.* 9:793 (1930); *Clayton in F.W.T.A. ed. 2, 3:423* (1972).

var. *anceps*

S. anceps var. *sericea* *Stapf ex Massey*, *Sudan Grasses* :33 (1926); *Broun & Massey, F.S.* :465 (1929); *Stapf in F.T.A.* 9:794 (1930); *Andr., F.P.S.* 3:533 (1956), *nom. inval.*

DARFUR Jebel Marra, massif, 1820 m; basalt clay depression. *Wickens* 1486a.

DISTRIBUTION Mauritania to Cameroon eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Mozambique, Rhodesia and Angola; introduced into S. Africa.

FLORISTIC CATEGORY Sudano-Zambezian Region.

905 *Setaria barbata* (*Lam.*) *Kunth, Rév. Gram.* 1:47 (1829); *Stapf & Hubbard in F.T.A.* 9:854 (1930); *Andr., F.P.S.* 3:537 (1956); *Cuf., Enum.* :1336 (1969); *Clayton in F.W.T.A. ed. 2, 3:424* (1972).

Panicum barbatum *Lam.*, *Tab. Encycl. Méth. Bot.* 1:171 (1797).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; shaded sites. *Blair* 118; *Wickens* 1652, 2191 & 2269; *Kassas* 257 (KHU & CAI, *n.v.*).

DISTRIBUTION Senegal to the Cameroons eastwards to Ethiopia, and in Angola; also in the Mascarenes and tropical Asia, introduced into the Americas. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Palaeotropical.

906 *Setaria incrassata* (*Hochst.*) *Hackel* in *Engl., Hochgebirgssfl. Trop. Afr.* :122 (1892); *Stapf & Hubbard in F.T.A.* 9:790 (1930); *Cuf., Enum.* :1337 (1969); *Wickens, For. Bull.* 14(N.S.) :48 (1969).

Panicum incrassatum *Hochst.* in *Flora* 38:197 (1855).

DARFUR Lowland plain, 1020–1220 m; *Acacia seyal* savanna. *Blair* 154; *Wickens* 2049 & 2750.

DISTRIBUTION Central and southern provinces of the Sudan Republic, Ethiopia and E. Africa into Zambia.

FLORISTIC CATEGORY Sudano-Zambezian Region.

907 *Setaria lynesii* *Stapf & Hubbard* in *F.T.A.* 9:786 (1930); *Andr., F.P.S.* 3:532 (1956); *Cuf., Enum.* :1337 (1969); *Quézel, Dossier* 5:140 (1969).

DARFUR Lowland plain, 700 m; periphery of clay depression.

Blair 313; *Wickens* 2015.

DISTRIBUTION Widely distributed through the central provinces of the Sudan (Map 204).

FLORISTIC CATEGORY Eastern Sahelian Domain.

908 *Setaria pallide-fusca* (*Schumacher*) *Stapf & Hubbard* in *Bull. Misc. Inf. Kew* 1930:259 (1930) & in *F.T.A.* 9:815 (1930); *Andr., F.P.S.* 3:535 (1956); *Quézel, Dossier* 5:140 (1969); *Wickens, For. Bull.* 14(N.S.) :48 (1969); *Clayton in F.W.T.A. ed. 2, 3:423, fig. 438* (1972).

Panicum pallide-fuscum *Schumacher, Beskr. Guin. Pl.* :58 (1827).

Setaria rubiginosa (*Steud.*) *Miq., Fl. Ned. Ind.* 3:467 (1857);

Broun & Massey, F.S. :464 (1929).

DARFUR Jebel Marra, piedmont and massif, 1160–1900 m;

lowland plain, 1020–1050 m; arable lands and moist depressions.

Pettet J. 20; *Blair* 8, 76, 97, 120, 322 & 329; *Wickens* 1163, 1400,

1778, 2037, 2051, 2117, 2318 & 2619. Vernacular name: (Fur)

aweet; (Arabic) *danab el falo*.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to the Cape; widespread in the tropics of the Old World, introduced into the New World. Widespread through the Sudan.

FLORISTIC CATEGORY Palaeotropical.

909 *Setaria plicatilis* (*Hochst.*) *Hackel* in *Engl., Hochgebirgssfl. Trop. Afr.* :121 (1892); *Stapf & Hubbard in F.T.A.* 9:847 (1930); *Cuf., Enum.* :1340 (1969); *Wickens, For. Bull.* 14(N.S.) :48 (1969).

Panicum plicatile *Hochst.* in *Flora* 38:198 (1855).

DARFUR Jebel Marra, piedmont and massif, 1160–1765 m;

shaded sites. *Pettet J.* 43; *Blair* 23 & 225; *Wickens* 1018, 116 & 1577.

DISTRIBUTION Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and south through E. Africa to the Cape; also in Arabia.

FLORISTIC CATEGORY Afriental and Zambezian Domains.

910 *Setaria sphacelata* (*Schumacher*) *Stapf & Hubbard ex M. B. Moss* in *Bull. Misc. Inf. Kew* 1929:195 (1929) & in *F.T.A.* 9:795 (1930); *Andr., F.P.S.* 3:533 (1956); *Cuf., Enum.* :1340 (1969); *Clayton in F.W.T.A. ed. 2, 3:423* (1972).

Panicum sphacelatum *Schumacher, Beskr. Guin. Pl.* :58 (1827).

DARFUR Jebel Marra, massif, 1525–1820 m; lowland plain, 1020 m; basalt clays and flood plain. *Blair* 391 & 392; *Wickens* 1846b, 2070, 2288, 2289, 2360 & 2583.

DISTRIBUTION Senegal to Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Sudano-Zambezian Region.

911 *Setaria verticillata* (*L.*) *P. Beauv.*, *Ess. Agrost.* :51, 178 (1812); *Stapf & Hubbard in F.T.A.* 9:824 (1930); *Broun & Massey, F.S.* :464 (1929); *Andr., F.P.S.* 3:535 (1956); *Cuf., Enum.* :1340 (1969); *Quézel, Dossier* 5:141 (1969); *Clayton in F.W.T.A. ed. 2, 3:421, fig. 439* (1972).

Panicum verticillatum *L.*, *Sp. Pl. ed. 2, :82* (1762).

DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020–1130 m; savanna. *Lynes* 632; *Blair* 17 & 139; *Wickens* 1045, 1779, 2096 & 2308.

DISTRIBUTION Mauritania to Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape; widely distributed in the tropics and warm temperate regions of the Old World, introduced into the New World. Widely distributed through the Sudan.

FLORISTIC CATEGORY Subcosmopolitan.

912 *Snowdenia polystachya* (*Fresen.*) *Pilger* in *Not. Bot. Gart. Berlin* 14:103 (1938); *Andr., F.P.S.* 3:538 (1956); *C. E. Hubbard in Hook., Icones Pl.* 37, t.3647 (1967); *Cuf., Enum.* :1361 (1969). *Beckera polystachya* *Fresen.*, *Mus. Senck.* 2:132 (1837).

DARFUR Jebel Marra, massif, 1900–2300 m; arable and fallow lands. *Jackson* 3878; *Wickens* 1238, 2598 & 2632; *Kassas* 504 (KHU & CAI, *n.v.*).

DISTRIBUTION Sudan Republic (Jebel Marra) and Ethiopia (Map 205); cultivated in E. Africa and present as an escape (from wool) in Europe. No further specimens seen for the Sudan but reported to be in the Fung *vide* F. W. Andrews.

FLORISTIC CATEGORY Ethiopian-montane.

Note: A small genus of 4 species, all in Africa. The genus has been recently monographed by C. E. Hubbard, *l. c.*

913 ***Sorghum aethiopicum*** (Hackel) Rupr. ex Stapf in F.T.A. 9:119 (1917); Broun & Massey, F.S. :443 (1929); Andr., F.P.S. 3:543, fig. 139 (1969); Cuf., Enum. :1369 (1969); Clayton in F.W.T.A. ed. 2, 3:467 (1972).

Andropogon sorghum Brotero subsp. *halepensis* Hackel var. *aethiopicus* Hackel in DC., Monogr. Phan. 6:504 (1889).

DARFUR Jebel Marra, massif, 2000 m; stream bank. Dandy 161 (BM!).

DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia. Widely distributed through the northern and central provinces of the Sudan.

FLORISTIC CATEGORY Sudanian and Afroriental Domains.

Note: The taxonomic status of the wild *Sorghum* species has not yet been satisfactorily worked out. It may well be that many of Snowden's 'species' are little more than 'races'.

914 ***Sorghum sudanense*** (Piper) Stapf in F.T.A. 9:113 (1917); Broun & Massey, F.S. :443 (1929); Andr., F.P.S. 3:540 (1956); Cuf., Enum. :1383 (1969); Clayton in F.W.T.A. ed. 2, 3:467 (1972).

Andropogon sorghum Brotero var. *sudanensis* Piper in Proc. Biol. Soc. Wash 28:33 (1915).

DARFUR Jebel Marra, piedmont and massif, 1160–2100 m; marshy places. Steele 31; Blair 219; Wickens 1057, 1420 & 1941. Vernacular name: (Fur) *nommi*, *numti* or *orang disor*; (Arabic) *adar*.

DISTRIBUTION Northern provinces of the Sudan Republic and Egypt; introduced into S. Africa, Australia and America.

FLORISTIC CATEGORY Eastern Sahelian Domain.

915 ***Sorghum usambarense*** Snowden in Journ. Linn. Soc. Bot. 55:245 (1955).

[*S. arundinaceum* sensu Wickens, For. Bull. 14(N.S.) :48 (1969), *non* (Willd.) Stapf (1917).]

DARFUR Jebel Marra, Suni, 1780 m; stream bank. Wickens 2709.

DISTRIBUTION Sudan Republic (Jebel Marra) and Tanzania.

FLORISTIC CATEGORY Zambezan Domain.

916 ***Sorghum verticilliflorum*** (Steud.) Stapf in F.T.A. 9:116 (1917); Broun & Massey, F.S. :443 (1929); Andr., F.P.S. 3:540 fig. 138 (1956); Cuf., Enum. :1383 (1969).

Andropogon verticilliflorus Steud., Syn. Pl. Glum. 1:393 (1854).

DARFUR Jebel Marra, massif, 1525–1780 m; river bank. Pettet J.7 & J.25; Wickens 1424.

DISTRIBUTION Southern provinces of the Sudan and Ethiopia south through E. Africa to the Transvaal and SW. Africa.

FLORISTIC CATEGORY Afroriental and Zambezan Domains.

917 ***Sporobolus angustifolius*** A. Rich., Tent. Fl. Abyss. 2:396 (1851); Cuf., Enum. :1273 (1968); Quézel, Dossier 5:141 (1969); Wickens, For. Bull. 14(N.S.) :49 (1969); Clayton, F.T.E.A. Gramin. :377 (1974).

DARFUR Jebel Marra, massif, 1900 m; stony soils. Blair 39.

DISTRIBUTION Sudan Republic (Jebel Marra, Jebel Gurgel and the Didinga Hills) and Ethiopia southwards through E. Africa to Malawi and Zambia.

FLORISTIC CATEGORY Afroriental and Zambezan Domains.

918 ***Sporobolus festivus*** Hochst. ex A. Rich., Tent. Fl. Abyss. 2:398 (1851); Broun & Massey, F.S. :474 (1929); Andr., F.P.S. 3:549 (1956); Cuf., Enum. :1274 (1968); Quézel, Dossier 5:141 (1969); Clayton in F.W.T.A. ed. 2, 3:410 (1972) & F.T.E.A. Gramin. :384 (1974).

Sporobolus festivus Hochst. ex A. Rich. var. *fibrosus* Stent in Bothalia 2:264 (1927); Broun & Massey, F.S. :474 (1929). DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; lowland plain, 900–1280 m; savanna, dominant grass throughout the area at the onset of the rains. Lynes 628; Blair 72 & 321; Wickens 1961, 1974, 2035 & 2609. Vernacular name: (Fur) *gulgi*; (Arabic) *koreib* or *umm tuk*. The seeds are harvested for grain in times of famine.

DISTRIBUTION Mauritania to Cameroon eastwards to Ethiopia and south through E. Africa to Transvaal and SW. Africa.

Widespread through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan Region.

919 ***Sporobolus ioclados*** (Trin.) Nees, Fl. Afr. Austr. :161 (1841); Clayton in F.W.T.A. ed. 2, 3:407 (1972) & F.T.E.A. Gramin. :367 (1974).

Vilfa ioclados Trin. in Mém. Acad. Sci. Pétersb. VI, Sci. Nat. 4:65 (1840).

Sporobolus marginatus A. Rich., Tent. Fl. Abyss. 2:397 (1851); Andr., F.P.S. 3:547 (1956); Cuf., Enum. :1277 (1968).

DARFUR Jebel Marra, piedmont, 1060 m; lowland plain, 600–1020 m; marshy places and waste land. Blair 318; Wickens 1989, 2024, 2281 & 2282.

DISTRIBUTION Mauritania and Cameroon eastwards to the Somali Republic and south through E. Africa to the Cape; also in India. Widely distributed through the central and southern provinces of the Sudan.

FLORISTIC CATEGORY Sudano-Zambezan and Saharo-Sindian Regions.

920 ***Sporobolus microprotus*** Stapf in Bull. Soc. Bot. Fr. 58, Mém. 2, 8:218 (1912); Cuf., Enum. :1277 (1968); Wickens, For. Bull. 14(N.S.) :49 (1969); Clayton in F.W.T.A. ed. 2, 3:407 (1972) & F.T.E.A. Gramin. :363 (1974).

Sporobolus scabriflorus Massey, Sudan Grasses :42 (1926); Broun & Massey, F.S. :474 (1929); Andr., F.P.S. 3:547 (1956).

DARFUR Jebel Marra, piedmont, 1100 m; lowland plain, 1020–1100 m; moist sites. Lynes 523; Blair 145; Wickens 2255 & 2294.

DISTRIBUTION Senegal to N. Nigeria eastwards to the Somali Republic, Uganda and Kenya. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Sudanian and Afroriental Domains.

921 ***Sporobolus panicoides*** A. Rich., Tent. Fl. Abyss. 2:399 (1851); Andr., F.P.S. 3:548 (1956); Cuf., Enum. :1278 (1968); Quézel, Dossier 5:141 (1969); Clayton, F.T.E.A. Gramin. :359, fig. 100 (1974).

DARFUR Jebel Marra, piedmont and massif, 1160–2130 m; lowland plain, 1190 m; savanna and fallow lands. Steele 37;

Blair 146; Wickens 2203, 2233 & 2704.

DISTRIBUTION Sudan Republic (Darfur Province), Ethiopia and Somali Republic southwards through E. Africa to the Transvaal and SW. Africa.

FLORISTIC CATEGORY Afroriental and Zambezan Domains.

922 ***Sporobolus paniculatus*** (Trin.) Dur. & Schinz, Consp. Fl. Afr. 5:823 (1895); Cuf., Enum. :1278 (1968); Clayton in F.W.T.A. ed. 2, 3:407 (1972) & F.T.E.A. Gramin. :361 (1974).

Vilfa paniculata Trin. in Mém. Acad. Sci. Pétersb. VI, 5, 2:67 (1840).

Sporobolus regularis Mez in Feddes Repert. 17:299 (1921); Clayton in Kew Bull. 19:294 (1963); Wickens, For. Bull. 14(N.S.) :49 (1969).

DARFUR Jebel Marra, piedmont, 1160 m; waste places. Blair 171; Wickens 2204.

DISTRIBUTION Senegal to Cameroon eastwards to Ethiopia and south through E. Africa to Zambia; also in Madagascar and (introduced?) Mexico. In the Sudan it is only recorded from Darfur and Kordofan provinces.

FLORISTIC CATEGORY Sudano-Zambezan and Madagascan Regions.

923 ***Sporobolus pellucidus*** *Hochst.* in *Flora* 38:201 (1855); Cuf., *Enum.* :1279 (1968); Quézel, *Dossier* 5:141 (1969); Wickens, *For. Bull.* 14(N.S.) :49 (1969); Clayton in *F.W.T.A.* ed. 2, 3:410 (1972) & *F.T.E.A. Gramin.* :374 (1974). DAFUR Lowland plain, 1190 m; stony soils. *Blair* 147. DISTRIBUTION Niger Republic eastwards to the Somali Republic and south through E. Africa to Zambia. In the Sudan apparently restricted to Darfur province. FLORISTIC CATEGORY Sudano-Zambezian Region.

924 ***Sporobolus pyramidalis*** *P. Beauv.*, *Fl. Owaré* 2:36, t.80 (1812); Broun & Massey, *F.S.* :474 (1929); Andr., *F.P.S.* 3:548 (1956); Clayton in *Kew Bull.* 19:287 (1965); Cuf., *Enum.* :1279 (1968); Clayton in *F.W.T.A.* ed. 2, 3:408 (1972) & *F.T.E.A. Gramin.* :373 (1974). DAFUR Jebel Marra, piedmont, 1100–1160 m; moist sites. *Blair* 4, 79, 91 & 233; *Wickens* 2118 & 2258. DISTRIBUTION Gambia to Cameroon eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; also in Madagascar, Mauritius and the Yemen and probably introduced into French Guiana, Brazil and Singapore. In the Sudan it occurs in the southern provinces. FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

925 ***Sporobolus stapfianus*** *Gandoger* in *Bull. Soc. Bot. Fr.* 66:302 (1920); Andr., *F.P.S.* 3:548 (1956); Cuf., *Enum.* :1281 (1968); Clayton in *F.W.T.A.* ed. 2, 3:410 (1972) & *F.T.E.A. Gramin.* :384 (1974). *S. festivus* A. Rich. var. *stuppeus* Stapf in *Fl. Cap.* 7:582 (1900); Broun & Massey, *F.S.* :474 (1929). DAFUR Jebel Marra, piedmont and massif, 1160–1900 m; savanna. *Wickens* 1919 & 2624. DISTRIBUTION Nigeria eastwards to Ethiopia and south through E. Africa to Natal and the Transvaal; also in Madagascar. In the Sudan it is found in the southern provinces. FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

926 ***Tetrapogon cenchrifomis*** (*A. Rich.*) *W. D. Clayton* in *Kew Bull.* 16:250 (1962); Cuf., *Enum.* :1287 (1968); Wickens, *For. Bull.* 14(N.S.) :49 (1969); Clayton in *F.W.T.A.* ed. 2, 3:399 (1972) & *F.T.E.A. Gramin.* :348, fig. 98 (1974). *Lepidopironia cenchrifomis* A. Rich., *Tent. Fl. Abyss.* 2:442, t.101 (1851). *Chloris spathacea* Hochst. ex Steud., *Syn. Pl. Glum.* 1:204 (1854); Broun & Massey, *F.S.* :480 (1929). *Tetrapogon spathaceus* (Hochst. ex Steud.) Hackel ex Dur. & Schinz, *Consp. Fl. Afr.* 5:864 (1895); Andr., *F.P.S.* 3:549 (1956); Quézel, *Dossier* 5:141 (1969). DAFUR Lowland plain, 1020–1130 m; savanna and arable lands. *Blair* 142; *Wickens* 1994. Vernacular name: (Fur) *koogi*; (Arabic) *koweel*. DISTRIBUTION Mauritania, Mali and Niger Republic eastwards to Ethiopia and south through E. Africa; also in Egypt and Arabia. Widespread through the Sudan. FLORISTIC CATEGORY Sahelian, Afriental and South Arabia Domains.

927 ***Themeda triandra*** *Forsk.* *Fl. Aegypt.-Arab.* :cxxxii & 178 (1775); Stapf in *F.T.A.* 9:416 (1919); Norman in *Journ. Bot.* 62:135 (1924); Broun & Massey, *F.S.* :453 (1929); Quézel, *Dossier* 5:141 (1969); Cuf., *Enum.* :1410 (1970); Clayton in *F.W.T.A.* ed. 2, 3:471, fig. 450 (1972). *T. triandra* var. *hispida* (Nees) Stapf in *F.T.A.* 9:418 (1919); Andr. *F.P.S.* 3:551, fig. 143 (1956). DAFUR Jebel Marra, massif, 1900–2800 m; upland grassland. *Lynes* 178; *Jackson* 2634; *Blair* 104, 105, 193 & 280; *Wickens* 1685 & 2147; *Kassas* 483 & 597 (both KHU & CAI, *n.v.*). Vernacular name: (Fur) *dimbil*.

DISTRIBUTION Mauritania to Nigeria eastwards to the Somali Republic and south through E. Africa to the Cape. In the Sudan it is found in the southern provinces. Widespread through the tropics of the Old World. FLORISTIC CATEGORY Palaeotropical

928 ***Tripogon leptophyllus*** (*A. Rich.*) *Cuf.*, *Enum.* :1269 (1968); Phillips & Launert in *Kew Bull.* 25:311, fig. 315 (1971). *Danthonia leptophylla* A. Rich., *Tent. Fl. Abyss.* 2:421 (1851). *Tripogon abyssinicus* Nees ex A. Rich., *Tent. Fl. Abyss.* 2:421 (1851); Quézel, *Dossier* 5:142 (1969); Wickens, *For. Bull.* 14(N.S.) :49 (1969); excl. specim. *Jackson* 2645. DAFUR Jebel Marra, piedmont and massif, 1160–2700 m; rock crevices and upland meadow. *Jackson* 3356 & 4075; *Blair* 335 & 387b; *Wickens* 2132, 2218, 2424, 2448, 2475b, 2522 & 2613. Vernacular name: (Fur) *kuggi*; (Arabic) *umm fesessiat*. DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra and its northern outlier, Jebel Gurgeil) and Ethiopia (Map 206 and Phillips & Launert *l. c.* map 2.). FLORISTIC CATEGORY Ethiopian-montane.

929 ***Tripogon minimus*** (*A. Rich.*) *Hochst. ex Steud.* *Syn. Pl. Glum.* 1:301 (1854); Andr., *F.P.S.* 3:554 (1956); Quézel, *Dossier* 5:142 (1969); Phillips & Launert in *Kew Bull.* 25:303, fig. 1 (1971); Clayton in *F.W.T.A.* ed. 2, 3:393 (1972) & *F.T.E.A. Gramin.* :289 (1974). *Festuca minima* A. Rich., *Tent. Fl. Abyss.* 2:436 (1851). DAFUR Jebel Marra, piedmont and foothills, 1130–1160 m; lowland plain, 1050–1190 m; rock crevices and other dry places. *Blair* 149; *Wickens* 2062, 2200 & 2242. DISTRIBUTION Mauritania to Nigeria eastwards to Ethiopia and south through E. Africa to Natal, Transvaal and SW. Africa; also in Madagascar (Map—Phillips & Launert *l. c.* map 1). Widely distributed through the northern and central provinces. FLORISTIC CATEGORY Sudano-Zambezian and Madagascar Regions.

930 ***Tripogon montanus*** *Chiov.* in *Ann. R. Ist. Bot. Roma* 8:351 (1908); Cuf., *Enum.* :1269 (1968); Wickens, *For. Bull.* 14(N.S.) :49 (1969); Phillips & Launert in *Kew Bull.* 25:314, fig. 3/4 (1971); Clayton, *F.T.E.A. Gramin.* :291 (1974). [*T. abyssinicus* sensu Wickens, *For. Bull.* 14(N.S.) :49 (1969) pro specim. *Jackson* 2645.] DAFUR Jebel Marra, massif, 2450–3070 m; upland meadow. *Jackson* 2645; *Blair* 354 & 367a; *Wickens* 2366 & 2475a. DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia and Uganda mountains (Map 207 and Phillips & Launert *l. c.* map 2). FLORISTIC CATEGORY Ethiopian-montane.

931 ***Urochloa trichopus*** (*Hochst.*) *Stapf* in *F.T.A.* 9:589 (1920); Broun & Massey, *F.S.* :458 (1929); Andr., *F.P.S.* 3:555 (1956); Cuf., *Enum.* :1325 (1969); Quézel, *Dossier* 5:142 (1969); Clayton in *F.W.T.A.* ed. 2, 3:440 (1972). *Panicum trichopus* Hochst. in *Flora* 27:254 (1844). DAFUR Jebel Marra, piedmont, 1150–1160 m; lowland plain, 1020–1130 m; savanna and fallow lands, especially moist places. *Blair* 130 & 330; *Wickens* 2050, 2072, 2252 & 2307. DISTRIBUTION Senegal to N. Nigeria eastwards to Ethiopia and south through E. Africa to the Transvaal and SW. Africa; also in Arabia and introduced into India. Widespread through the Sudan. FLORISTIC CATEGORY Sudano-Zambezian Region.

932 ***Vulpia bromoides*** (*L.*) *S. F. Gray*, *Nat. Arr. Brit. Pl.* 2:124 (1821); Andr., *F.P.S.* 3:557 (1956); Cuf., *Enum.* :1216 (1968); W. D. Clayton, *F.T.E.A. Gramin.* :64, fig. 22 (1970) & in *F.W.T.A.* ed. 2, 3:369, fig. 423 (1972). *Festuca bromoides* L., *Sp. Pl.* :175 (1753). DAFUR Jebel Marra, massif, 2200–3070 m; upland meadow and arable lands. *Dandy* 746 (BM, *n.v.*); *Jackson* 2645a & 3878; *Blair* 283, 292, 305, 306, 352 & 372; *Wickens* 1687, 2367 & 2471.

DISTRIBUTION Cameroon Mtn. and uplands of the Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia and Kenya; also in Europe and the Mediterranean region (Map 208). Introduced into S. Africa and most other warm temperate countries.
FLORISTIC CATEGORY Palaearctic with Afro-montane extensions.

Pteridophytes

Fern Allies

933 **Equisetum ramosissimum** Desf., Fl. Atlant. 2:398 (1799); MacLeay in Sudan Notes & Recs., 34:290 (1953) & in Webbia 11:590 (1955); Schelpe, Fl. Zambes. Pterid. :32, t.7 (1970). DARFUR Jebel Marra, piedmont and massif, 1160–2400 m; marshy places. *Steele* 3a; *Dandy* 61 (BM!); *Wickens* 1021, 1064, 1194, 1438, 1545, 1546, 1702 & 2818; *Kassas* 203, 422, 652 & 737 (all KHU & CAI, *n.v.*). Vernacular name: (Fur) *juguld*. DISTRIBUTION Widespread in Africa, except W. Africa, not recorded elsewhere in the Sudan; also in central and southern Europe into Asia, and in central and southern America.
FLORISTIC CATEGORY Subcosmopolitan.

Ferns

934 **Actiniopteris radiata** (Swartz) Link, Fil. Sp. :80 (1841); Alston, F.W.T.A. Suppl. :44 (1959); Pichi-Serm. in Adumbr. Fl. Aeth. 10:318, fig. 1, (1963); Schelpe, Fl. Zambes. Pterid. :138, t.42C (1970). *Asplenium radiatum* Swartz in Schrad., Journ. Bot. 1800(2) :50 (1801). DARFUR Jebel Marra, massif, 1900 m; lowland plain, 1020–1100 m; rock crevices. *Lynes* 633; *Wickens* 1978 & 2615. DISTRIBUTION Nigeria and Cameroon eastwards to Ethiopia and south through E. Africa into southern Africa; also from Egypt across to India and Ceylon. Widely distributed through the Sudan.
FLORISTIC CATEGORY Sudano-Zambezian and Deccan Regions.

935 **Actiniopteris semiflabellata** Pichi-Serm. in Webbia 17:24, fig. 4 (1962) & in Adumbr. Fl. Aeth. 10:323, fig. 3 (1963). [*Actiniopteris australis* sensu MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:595 (1955); Quézel, Dossier 5:143 (1969), *non* (L.f.) Link (1841).] DARFUR Jebel Marra, piedmont and massif, 1160–1900 m; rock crevices. *Steele* 42; *K.M. Ali* 128; *Wickens* 1015, 1492, 1914, 2596 & 2978. DISTRIBUTION Sudan Republic (Jebel Marra, Red Sea Hills, Nuba Mountains and southern provinces), Ethiopia and E. Africa; also in Madagascar, Egypt, Arabia and Nepal.
FLORISTIC CATEGORY Sudano-Zambezian, Madagascan and Himalayan Regions.

936 **Adiantum capillus-veneris** L., Sp. Pl. :1096 (1753); Lester-Garland in Journ. Bot. 59:47 (1921); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:596 (1955); Pichi-Serm. in Adumbr. Fl. Aeth. 5:678, fig. 8 (1957); Alston, F.W.T.A. Suppl. :39 (1959); Quézel, Dossier 5:143 (1969); Schelpe, Fl. Zambes. Pterid. :112, t.36B (1970). DARFUR Jebel Marra, piedmont and massif, 1160–2950 m; shady, moist sites. *Lynes* s.n. (BM!) & 45; *Macintosh* 75; *Steele* 3 & 25; *Dandy* 65 (BM!); *K.M. Ali* 132 & 133; *Jackson* 2639 (KHU, *n.v.*); *Wickens* 985, 1095 & 1467. DISTRIBUTION Widespread throughout the world. In the Sudan it also occurs in the Red Sea Hills.
FLORISTIC CATEGORY Cosmopolitan.

937 **Adiantum philippense** L., Sp. Pl. :1094 (1753); Pichi-Serm. in Adumbr. Fl. Aeth. 5:665, fig. 4 (1957); Alston, F.W.T.A. Suppl. :39 (1959); Schelpe, Fl. Zambes. Pterid. :110, t.36G (1970). DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1050 m; rock crevices. *Wickens* 1915 & 1980. DISTRIBUTION Widespread through the tropics of the Old and New Worlds. In the Sudan it occurs in the southern provinces.
FLORISTIC CATEGORY Pantropical.

938 **Adiantum poiretii** Wikstr. in Svensk. Vet. Akad. Handl. 1825:443 (1826); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:596 (1955); Alston, F.W.T.A. Suppl. :39 (1959); Schelpe, Fl. Zambes. Pterid. :112, t.36D (1970). *A. thalictroides* Willd. ex Schlecht., Adumbr. Pl. 5:53 (1832); Pichi-Serm. in Adumbr. Fl. Aeth. 5:687, fig. 10 (1957). DARFUR Jebel Marra, massif, 2290–2750 m; rock crevices. *Rugman* 10; *Wickens* 2387; *Kassas* 474 (KHU, *n.v.*). DISTRIBUTION Cameroon Mtn., Sudan Republic (Jebel Marra, Red Sea Hills and the Imatongs), Ethiopia and the highlands of E. Africa; also in Asia and S. America.
FLORISTIC CATEGORY Pantropical.

939 **Anogramma leptophylla** (L.) Link, Fil. Sp. :137 (1841); Pichi-Serm. in Adumbr. Fl. Aeth. 13:497, fig. 1 (1966); Schelpe, Fl. Zambes. Pterid. :99, t.32 (1970). *Polypodium leptophyllum* L., Sp. Pl. :1092 (1753). DARFUR Jebel Marra, piedmont and massif, 1160–200 m; moist rock crevices. *Wickens* 2113 & 2142. DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra and Red Sea Hills), Ethiopia and E. Africa; widespread through the world.
FLORISTIC CATEGORY Subcosmopolitan.

940 **Aspidotis schimperii** (Kunze) Pichi-Serm. in Webbia 7:326 (1950); Alston, F.W.T.A. Suppl. :44 (1959); Schelpe, Fl. Zambes. Pterid. :113, t.37A (1970). *Cheilanthes schimperii* Kunze, Farrnkr. 1:52, t.26 (1840). *Hypolepis schimperii* (Kunze) Hook., Sp. Fil. 2:70 (1852); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:593 (1955). DARFUR Jebel Marra, piedmont and massif, 1160–1525 m; lowland plain, 1050–1100 m; rock crevices. *Lynes* 634; *Wickens* 1813, 1986 & 2130. DISTRIBUTION N. Nigeria eastwards to Ethiopia and south through E. Africa to Rhodesia. In the Sudan it is stated to occur in the Red Sea Hills *vide* MacLeay (1955) but no specimens seen.
FLORISTIC CATEGORY Sudano-Zambezian Region.

941 **Asplenium abyssinicum** Fée, Gen. Fil. :199 (1852); MacLeay in Webbia 11:598 (1955); Alston, F.W.T.A. Suppl. :57 (1959); Schelpe, Fl. Zambes. Pterid. :177 (1970), *in obs.* DARFUR Jebel Marra, massif, 2950 m. *Lynes* 193. DISTRIBUTION Cameroon Mtn., Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and the mountains of eastern and southern Africa.
FLORISTIC CATEGORY Afro-montane.

942 **Asplenium aethiopicum** (Burm.f.) Becherer in Candollea 6:23 (1935); Alston, F.W.T.A. Suppl. :59 (1959); Schelpe, Fl. Zambes. Pterid. :181 (1970). *Trichomanes aethiopicum* Burm.f., Fl. Cap. Prodr. in Fl. Ind. :32 (err. 28) (1768). [*Asplenium praemorsum* sensu Norman in Journ. Bot. 62:135 (1924), *non* Swartz (1788).] DARFUR Jebel Marra, massif, 1765–3070 m; moist rock fissures. *Lynes* 189a, 190a; *Dandy* 110 (BM!); *Jackson* 2654 (BM!); *Wickens* 1931, 2141 & 2380. DISTRIBUTION Widespread through tropical and southern Africa. In the Sudan it also occurs in the Didinga Hills.
FLORISTIC CATEGORY Sudano-Zambezian Region.

- 943 ***Asplenium pumilum* Swartz**, Nov. Gen. & Sp. Pl. :129 (1788); Schelpe, Fl. Zambes. Pterid. :178 (1970).
subsp. ***hymenophylloides* (Fée) Schelpe** in Bol. Soc. Brot. II, 41:210 (1967) & Fl. Zambes. Pterid. :178 (1970).
Asplenium pumilum Swartz var. *hymenophylloides* Fée, Mém. Fam. Foug. 7:54, t.15, 4 (1857).
Asplenium eylesii Sim, Ferns of S.Afr. ed. 2, :147, pl. 61, fig. 2 (1915).
DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; rock crevices. *Wickens* 9950, 2114 & 2536.
DISTRIBUTION N. Nigeria eastwards to Ethiopia and in Malawi and Rhodesia; also in NW. India. In the Sudan it also occurs in the Red Sea Hills and southern provinces.
FLORISTIC CATEGORY Sudano-Zambezian and Saharo-Sindian Regions.
- 944 ***Athyrium scandicinum* (Willd.) Presl**, Tent. Pterid. :98 (1836); Schelpe, Fl. Zambes. Pterid. :204 (1970).
Aspidium scandicinum Willd., Sp. Pl. ed. 4, 5:285 (1810).
DARFUR Jebel Marra, massif, 1900 m; rock crevices. *Wickens* 2140.
DISTRIBUTION Widely distributed through the mountains of the Sudan Republic (Jebel Marra and the Imatongs), eastern and southern Africa; also in Reunion.
FLORISTIC CATEGORY Afro-montane.
- 945 ***Athyrium schimperi* Moug. ex Fée**, Gen. Fil. :187 (1852); Alston, F.W.T.A. Suppl. :64 (1959); Schelpe, Fl. Zambes. Pterid. :202, t.57B (1970).
DARFUR Jebel Marra, massif, 2600 m; rock crevices. *Wickens* 2691.
DISTRIBUTION Mountains of Cameroon, Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and E. Africa; also in the Himalayas.
FLORISTIC CATEGORY Afro-montane & Himalayan Regions.
- 946 ***Ceratopteris cornuta* (P. Beauv.) Lepr.** in Ann. Sci. Nat. I, 19:103, t.4A (1830); Alston, F.W.T.A. Suppl. :38, fig. 9 (1959).
Pteris cornuta P. Beauv., Fl. Owaré 1:63, t.37, fig. 2, 38 (1809).
DARFUR Jebel Marra, piedmont, 1180 m; aquatic. *Wickens* 2827.
DISTRIBUTION Widespread through tropical Africa and Asia. In the Sudan it occurs in the southern provinces.
FLORISTIC CATEGORY Palaeotropical.
- 947 ***Cheilanthes anceps* Blanford** in Journ. Simla Nat. Hist. Soc. 1(2):21 (1886).
DARFUR Jebel Marra, piedmont, Mortagello, 1160 m; gallery forest. *Wickens* 2121.
DISTRIBUTION Nigeria, Sudan Republic (Jebel Marra) and in India.
FLORISTIC CATEGORY ?Himalayan Region with Sudanian extensions.
- 948 ***Cheilanthes coriacea* Decne.** in Arch. Mus. 2:190 (1841); MacLeay in Sudan Notes & Recs. 34:190 (1953) & in Webbia 11:596 (1955); Quézel, Dossier 5:143 (1969).
DARFUR Jebel Marra, massif, 1900–2050 m; rock crevices.
K.M.Ali 129; *Wickens* 2638; *Kassas* 289 (KHU & CAI, *n.v.*).
DISTRIBUTION Sudan Republic (Jebel Marra and the Red Sea Hills), Ethiopia and Tanzania; also in Egypt and Arabia.
FLORISTIC CATEGORY Sudanian, Afriental and Arabian Domains.
- 949 ***Cheilanthes farinosa* (Forsk.) Kaulf.**, Enum. Fil. :212 (1824); MacLeay in Sudan Notes & Recs. 34:190 (1953) & in Webbia 11:596 (1955); Alston, F.W.T.A. Suppl. :43 (1959); Quézel, Dossier 5:143 (1969); Schelpe, Fl. Zambes. Pterid. :122 (1970).
Pteris farinosa Forsk., Fl. Aegypt.-Arab. :cxxxiv, 187 (1775).
DARFUR Jebel Marra, piedmont and massif, 1160–2290 m; rock crevices. *Wickens* 1589 & 1913; *Kassas* 3896 & 477 (KHU & CAI, *n.v.*).

DISTRIBUTION Widespread through tropical Africa and Asia. In the Sudan it occurs on Jebel Marra, Red Sea Hills and the Imatongs.
FLORISTIC CATEGORY Palaeotropical.

- 950 ***Cystopteris fragilis* (L.) Bernh.** in Schrad., Neues Journ. Bot. 1, 2:26 t.2, fig. 9 (1806); Norman in Journ. Bot. 62:135 (1924); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:601 (1955); Alston, F.W.T.A. Suppl. :64 (1959).
Polypodium fragile L., Sp. Pl. :1091 (1753).
DARFUR Jebel Marra, massif, 2290–2950 m; rock crevices.
Lynes 192; *Wickens* 2379; *Kassas* 477 (KHU & CAI *n.v.*).
DISTRIBUTION Cameroon Mtn., Sudan Republic (Jebel Marra and the Imatongs), Ethiopia and mountains of eastern and southern Africa; widely distributed in the temperate regions of the world and tropical mountains.
FLORISTIC CATEGORY Subcosmopolitan.

- 951 ***Dryopteris inaequalis* (Schlecht.) Kuntze**, Rev. Gen. Pl. 2:813 (1891); Schelpe, Fl. Zambes. Pterid. :221 (1970).
Aspidium inaequale Schlecht., Adumbr. Pl. :23, t.12 (1825).
[*Dryopteris schimperana* sensu Norman in Journ. Bot. 62:135 (1924); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:603 (1955), *non* (Hochst. ex A. Braun) C. Chr. (1905).]
DARFUR Jebel Marra, massif, 2600 m. *Lynes* 187. This specimen is immature so that its exact identity must remain in doubt.
DISTRIBUTION Generally distributed through tropical and southern Africa. In the Sudan it also occurs in the Imatongs.
FLORISTIC CATEGORY Sudano-Zambezian Region.

- 952 ***Hypodematium crenatum* (Forsk.) Kuhn** in v. Deck., Reis. Ost-Afr. Bot. 3, 3:37 (1879); Quézel, Dossier 5:143 (1969); Schelpe, Fl. Zambes. Pterid. :230, t.66 (1970).
Polypodium crenatum Forsk., Fl. Aegypt.-Arab. :cxxxv, 185 (1775).
DARFUR Jebel Marra, massif, 1525–2150 m; rock crevices. *Steele* 39; *Wickens* 2152 & 2977.
DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Kenya and Zambia; also in Arabia, Mascarene Is., India and SE. Asia.
FLORISTIC CATEGORY Palaeotropical.

- 953 ***Marsilea minuta* L.**, Mant. Pl. Alt. :308 (1771); Launert in Senck. Biol. 49:291, fig. 32–34 (1968); Schelpe, Fl. Zambes. Pterid. :60, t.17B (1970).
M. diffusa Lepr. ex A. Braun in Flora 22:300 (1839).
DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; aquatic, also marshy ground. *Wickens* 1002, 1360a, 1360b, 1522 & 2974; *Kassas* 360:3 (KHU & CAI, *n.v.*). Terrestrial form with tufted small-leaved, aquatic form with long rhizomes which when young float and raise the leaves above the surface of the water; older rhizomes sunken so that leaves float.
DISTRIBUTION Gambia to Nigeria eastwards to the southern provinces of the Sudan Republic and south through E. Africa to Zambia and Angola; also in Algeria, Madagascar, India and Malaya.
FLORISTIC CATEGORY Palaeotropical.

- 954 ***Notholaena* sp.**
DARFUR Jebel Marra, massif, 2750 m; soil pockets on bare pumice.
Wickens 2399.

- 955 ***Ophioglossum costatum* R.Br.**, Prodr. Fl. Nov. Holl. :163 (1810); Pichi-Serm. in Adumbr. Fl. Aeth. 3:626, fig. 1 (1954); Alston, F.W.T.A. Suppl. :18 (1959); Schelpe, Fl. Zambes. Pterid. :38, t.80 (1970).
DARFUR Jebel Marra, piedmont, 1160 m; lowland plain, 1020 m; bare soil between grass tufts. *Wickens* 1973 & 2199b.
DISTRIBUTION Widespread in tropical and southern Africa; also in Madagascar, India, SE. Asia and Australia. In the Sudan it occurs in the southern provinces.
FLORISTIC CATEGORY Palaeotropical.

956 **Ophioglossum gomezianum** *Welw. ex A. Braun* in Kuhn, Fil. Afr. :176 (1868); Alston, F.W.T.A. Suppl. :19 (1959); Schelpe, Fl. Zambes. Pterid. :35, t.8D (1970).

DARFUR Jebel Marra, piedmont and massif, 1160–2350 m; bare soil between tufts of grasses. *Wickens* 2199c & 2365.

DISTRIBUTION Sierra Leone to Cameroon, southern provinces of the Sudan Republic, Malawi, Zambia, Rhodesia and Angola.

FLORISTIC CATEGORY Sudanian and Zambezan Domains.

957 **Ophioglossum reticulatum** *L.*, Sp. Pl. :1063 (1753); Schelpe, Fl. Zambes. Pterid. :37 (1970).

DARFUR Jebel Marra, piedmont and massif, 1160–1350 m; bare soil between tufts of grasses. *Wickens* 1944, 2199a & 2541.

DISTRIBUTION Widely distributed in tropical and southern Africa; also in southern Asia across to Australia. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Palaeotropical.

958 **Polystichum setiferum** (*Forsk.*) *Moore ex Woyнар* in Mitt. Naturw. Ver. Steierm. 49:181 (1913).

Polypodium setiferum *Forsk.* Fl. Aegypt.-Arab. :185 (1775).

var. **fuscopaleaceum** (*Alston*) *Schelpe* in Bol. Soc. Brot. II, 41:216 (1967) & Fl. Zambes. Pterid. :226, t.64B (1970).

Polystichum fuscopaleaceum *Alston* in Bol. Soc. Brot. II, 30:22 (1956) & F.W.T.A. Suppl. :70 (1959).

[*P. setiferum* sensu MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:603 (1955), *non* (*Forsk.*) *Moore* ex Woyнар sensu stricto.]

DARFUR Jebel Marra, massif, 2700–3000 m; *Dandy* 114 (BM!).

DISTRIBUTION Cameroon Mtn. and highlands of Sudan Republic (Jebel Marra and the Imatongs), eastern and southern Africa.

FLORISTIC CATEGORY Afro-montane.

959 **Pteridium aquilinum** (*L.*) *Kuhn* in v. Deck., Reis. Ost-Afr. Bot. 3,3:11 (1879); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:594 (1955); Alston, F.W.T.A. Suppl. :33 (1959); Schelpe, Fl. Zambes. Pterid. :88 (1970).

Pteris aquilina *L.*, Sp. Pl. :1073 (1753); Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:135 (1924).

DARFUR Jebel Marra, massif, c.1350–2450 m; upland grassland. *Lynes* s.n. (BM, *n.v.*), 47 & 186; *Rugman* 11; *Dandy* 130 (BM!); *Wickens* 1208; *Kassas* 270, 282 & 561 (all KHU & CAI, *n.v.*).

DISTRIBUTION Widespread through the world. In the Sudan it occurs in the southern provinces.

FLORISTIC CATEGORY Cosmopolitan.

960 **Pteris dentata** *Forsk.*, Fl. Aegypt.-Arab. :cxxxiv, 186 (1775); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:594 (1955); Alston, F.W.T.A. Suppl. :42 (1959); Schelpe, Fl. Zambes. Pterid. :117 (1970).

subsp. **flabellata** (*Thunb.*) *Runemark* in Bot. Not. 115:190 (1962); Schelpe, Fl. Zambes. Pterid. :117 (1970).

P. flabellata *Thunb.*, Prodr. Fl. Cap. :172 (1800); Norman in Journ. Bot. 62:135 (1924).

DARFUR Jebel Marra, piedmont and massif, 1160–3000 m; rocky stream banks. *Lynes* 14, 43 & 195 (BM, *n.v.*); *Steele* 26 & 27; *Dandy* 104 & 113 (both BM!); *Jackson* 2640 (KHU, *n.v.*); *Wickens* 1083 & 1316; *Kassas* 267, 268, 282a & b, 585 & 773 (all KHU & CAI, *n.v.*). Vernacular name: (Arabic) *armit*.

DISTRIBUTION Uplands of the Sudan Republic (Jebel Marra), Ethiopia, eastern and southern Africa; also in Arabia and Mascarene Is.

FLORISTIC CATEGORY Afro-montane.

961 **Pteris vittata** *L.*, Sp. Pl. :1704 (1753); MacLeay in Sudan Notes & Recs. 34:290 (1953) & in Webbia 11:595 (1955); Alston, F.W.T.A. Suppl. :40 (1959); Schelpe, Fl. Zambes. Pterid. :115 (1970).

[*P. longifolia* sensu Lester-Garland in Journ. Bot. 59:47 (1921); Norman in Journ. Bot. 62:135 (1924); *non* *L.* (1753).]

DARFUR Jebel Marra, piedmont and massif, 1160–2900 m; rocky stream banks. *Lynes* s.n. & 194; *Steele* 8 & 41; *Dandy* 153 (BM!); *K.M. Ali* 125; *Wickens* 1022, 1055 & 1574; *Kassas* 269, 377 & 774 (all KHU & CAI, *n.v.*).

DISTRIBUTION Widely distributed in the tropics and subtropics of the Old World, introduced into the New World. Only known in the Sudan from Jebel Marra.

FLORISTIC CATEGORY Palaeotropical.

962 **Thelypteris bergiana** (*Schlecht.*) *Ching* in Bull. Fan Mem. Inst. Biol. Bot. 10:251 (1941); Alston, F.W.T.A. Suppl. :61 (1959); Schelpe, Fl. Zambes. Pterid. :193, t.55B (1970).

Polypodium bergianum *Schlecht.*, Adumbr. Fil. :20, t.9 (1825).

[*Nephrodium gueinzianum* sensu Norman in Journ. Bot. 62:135 (1924), *non* (*Mett.*) *Hieron.* (1900).]

[*Dryopteris* sp. aff. *membranifera* sensu MacLeay in Webbia 11:603 (1955), *non* Christensen (1925).]

[*D. pseudogueintziana* sensu MacLeay in Webbia 11:603 (1955), *non* Bonap. (1913).]

DARFUR Jebel Marra, piedmont and massif, 1160–3000 m; stream banks. *Lynes* 191; *Dandy* 105 (BM!); *K.M. Ali* 127; *Jackson* 2638 (BM!).

DISTRIBUTION Nigeria and Cameroon eastwards to Ethiopia and south through East and southern Africa. In the Sudan it is said to occur in the Imatongs *fide* MacLeay (1955), but no specimens seen.

FLORISTIC CATEGORY Sudano-Zambezan Region.

963 **Thelypteris confluens** (*Thunb.*) *Morton* in Contrib. U.S. Nat. Herb. 38:71 (1967); Schelpe, Fl. Zambes. Pterid. :190, t.55E (1970).

Pteris confluens *Thunb.*, Prodr. Fl. Cap. :171 (1800).

Nephrodium thelypteris *L.* var. *squamulosum* (*Hook.f.*) *Hook.*, Sp. Fil. 4:88 (1862); Norman in Journ. Bot. 62:135 (1924).

[*Dryopteris thelypteris* sensu MacLeay in Webbia 11:603 (1955), *non* (*L.*) *Gray* (1848).]

Thelypteris palustris *Schott* var. *squamigera* (*Schlecht.*) *Weath.* in Contrib. Gray Herb. n.s., 73:40 (1924).

DARFUR Jebel Marra, massif, 1550–2050 m; stream bank and swampy places. *Lynes* 6; *Dandy* 72 (BM!).

DISTRIBUTION Cameroon, Sudan Republic (Jebel Marra), Ethiopia, eastern and southern Africa; also in southern Asia and Australia.

FLORISTIC CATEGORY Palaeotropical.

964 **Thelypteris dentata** (*Forsk.*) *E. St. John* in Am. Fern Journ. 26:44 (1936); Schelpe, Fl. Zambes. Pterid. :197 (1970). *Polypodium dentatum* *Forsk.*, Fl. Aegypt.-Arab. :cxxxv, 185 (1775). *Cyclosorus dentatus* (*Forsk.*) *Ching* in Bull. Fan Mem. Inst. Biol. 8:206 (1938); Alston, F.W.T.A. Suppl. :62 (1959).

DARFUR Jebel Marra, piedmont and massif, 1160–1765 m; rock crevices. *Wickens* 1529 & 1595; *Kassas* 211, 266, 282c & 378 (all KHU & CAI, *n.v.*).

DISTRIBUTION A forest species widely distributed through tropical subtropical Africa and America; also in Madagascar, Seychelles and the Yemen. In the Sudan it is also recorded from Torit in the southern provinces.

FLORISTIC CATEGORY Pantropical.

965 **Thelypteris gueinziana** (*Mett.*) *Schelpe* in Journ. S. Afr. Bot. 31:262, t.1a (1965) & Fl. Zambes. Pterid. :194 (1970).

Aspidium gueinzianum *Mett.* in Abh. Senck. Nat. Ges. 2:367 (1857).

[? *Dryopteris patens* sensu Lester-Garland in Journ. Bot. 59:47 (1921), *non* (*Swartz*) *Kuntze* (1891).]

DARFUR Jebel Marra, piedmont and massif, 1160–2225 m; rocky stream banks. *Lynes* s.n. (BM!), the specimen is immature and lacks its rhizome, so its identity must remain in doubt; *Jackson* 2564 (BM!); *Wickens* 1528 & 2122.

DISTRIBUTION Sudan Republic (Jebel Marra), Ethiopia, Tanzania and southern Africa.

FLORISTIC CATEGORY Afriental and Zambezan Domains.

966 **Thelypteris quadrangularis** (Fée) Schelpe in Journ. S. Afr. Bot. 30:196, t.1b (1964) & Fl. Zambes. Pterid. :195 (1970).
Nephrodium quadrangulare Fée, Mém. Fam. Foug. :308 (1852).
Cyclosorus quadrangularis (Fée) Tard. in Not. Syst. 14:345 (1952);
 Alston, F.W.T.A. Suppl. :62 (1959).
 DARFUR Jebel Marra, massif, 1350–1765 m; stream bank in gallery forest. *Wickens* 1305; *Kassas* 282c & 293:25 (KHU & CAI, n.v.).

DISTRIBUTION Forests of Sierra Leone to Nigeria eastwards to the Sudan Republic (Jebel Marra and the Lotti Forest) and south through E. Africa to Mozambique and Angola; also in tropical Asia and S. America.

FLORISTIC CATEGORY Pantropical.

Bryophytes

(determined by N. H. Norkett, British Museum, Natural History.)
 An account of the bryophytes of the Sudan is being prepared by Dr. Pettet, consequently only the minimum information is presented here.

Hepatics

967 **Grimaldia dichotoma** Raddi in Opusc. Sci. Bologna 2:356 (1818).
 DARFUR Jebel Marra, massif, 1500 m; wet rocks. *Wickens* 2160 (BM!).
 DISTRIBUTION Widespread through the Mediterranean area and extending to Ethiopia.
 FLORISTIC CATEGORY Mediterranean Region and Oriental Domain.

968 **Marchantia polymorpha** L., Sp. Pl. ed. 2, :1603 (1763).
 DARFUR Jebel Marra, massif, 1780 m; river bank. *Wickens* 1480 (BM!).
 DISTRIBUTION Widely distributed throughout the World.
 FLORISTIC CATEGORY Cosmopolitan.

Musci

969 **Brachymenium** sp.
 DARFUR Jebel Marra, massif, 1340–2750 m; river bank and upland meadow. *Wickens* 2383a & b (both sterile) & 2538 (all BM!).

970 **Bryum** sp. near **B. pseudotriquetrum** (Hedw.) Schwaegr.
 DARFUR Jebel Marra, massif, 2150 m; wet rocks. *Wickens* 2878 (BM!).

971 **Drepanocladus** sp. near **D. aduncus** (Hedw.) Warnst.
 DARFUR Jebel Marra, massif, 2150 m; mossy sponge. *Wickens* 2877 (BM!).
 Note: A very stout form, approaching *D. badius* (Hartm.) Roth

972 **Funaria hygrometrica** Hedw., Sp. Musc. :172 (1801).
 var. **calvescens** (Schwaegr.) Kindb., Eur. N. Am. Bryin. 2:330 (1897).
 DARFUR Jebel Marra, massif, 1500 m; wet rocks. *Wickens* 2161 & 2162 (both BM!).
 DISTRIBUTION Widespread through the tropics.
 FLORISTIC CATEGORY Pantropical.

973 **Leptobryum pyriforme** (Hedw.) Wilson, Bryol. Brit. :219 (1855).
 DARFUR Jebel Marra, massif, 1780 m; river bank. *Wickens* 1480a (BM!).
 DISTRIBUTION Widespread through the World.
 FLORISTIC CATEGORY Cosmopolitan.

974 **Leptodontium viticulosoides** (P. Beauv.) Wijk & Marg. in Taxon 9:51 (1960).
 DARFUR Jebel Marra, massif, 2750 m; dry pumice. *Wickens* 2378a (BM!).
 DISTRIBUTION Widespread through the tropical highlands.
 FLORISTIC CATEGORY Pantropical.

975 **Physcomitrium** sp. or **Funaria** sp. (young capsule).
 DARFUR Jebel Marra, massif, 2750 m; upland meadow. *Wickens* 2383a (BM!).

976 **Polytrichum juniperinum** Wild. ex Hedw., Sp. Musc. :89 (1801).
 DARFUR Jebel Marra, massif, 2750 m; upland meadow (sterile). *Wickens* 2381 (BM!).
 DISTRIBUTION Widespread through the World, but mainly at the higher elevations in the tropics.
 FLORISTIC CATEGORY Cosmopolitan.

Algae

Characeae

(determined by Dr. R. D. Wood, Kingston, Rhode Island).

977 **Chara vulgaris** L., Sp. Pl. :1156 (1753).
 DARFUR Jebel Marra, piedmont and massif, 1160–1650 m; aquatic. *Jackson* 2383 (BM!), a partly gymnophyllous form; *Wickens* 1004 (BM!), a peculiarly slender variant, partly gymnophyllous.
 DISTRIBUTION Widespread throughout the world.
 FLORISTIC CATEGORY Cosmopolitan.

Fungi

Basidiomycetes

(determined by Dr. D. A. Reid, Kew).

978 **Corioloopsis occidentalis** (Klotzsch) Murrill in Bull. Torrey Bot. Club 32:358 (1905).
 DARFUR Lowland plain, 1020 m; bracket fungus on *Anogeissus leiocarpus*. *Wickens* 2855.
 DISTRIBUTION Widespread through the tropics.
 FLORISTIC CATEGORY Pantropical.

979 **Funalia funalis** (Fries) Patouillard, Ess. Taxon. :95 (1900).
 DARFUR Lowland plain, 1020 m; bracket fungus on *Anogeissus leiocarpus*. *Wickens* 2854.
 DISTRIBUTION Widespread through the tropics of the Old World.
 FLORISTIC CATEGORY Palaeotropical.

980 **Phaeoglyphopus sudanicus** (Hariat & Patouillard) Singer, Agaric. in Mod. Taxon. ed. 2, :712 (1962).
 DARFUR Jebel Marra, piedmont, 1160 m; savanna. *Wickens* photo.
 DISTRIBUTION Widespread through the tropics of the Old World.
 FLORISTIC CATEGORY Palaeotropical.

981 **Pyropolyporus robiniae** Murrill in Bull. Torrey Bot. Club 30:114 (1903).
 DARFUR Lowland plain, 975–1020 m; bracket fungus on *Acacia seyal* and *Albizia amara* subsp. *sericocephala*. *Wickens* 2894 & 2951.
 DISTRIBUTION Warm and temperate regions of the World.
 FLORISTIC CATEGORY Subcosmopolitan.

982 **Trametes socotrana** Cooke in Proc. Roy. Soc. Edin.

11:456 (1882).

DARFUR Lowland plain, 790 m; bracket fungus on *Acacia seyal*.

Wickens 2895.

DISTRIBUTION E. Africa.

FLORISTIC CATEGORY Afrotropical and Zambezian Domains.

Additions and corrections:

397 **Arbulocarpus sphaerostigma** (A. Rich.) Tennant should now be known as *Spermacoce sphaerostigma* (A. Rich.) Oliver. See discussion by my colleague Dr Verdcourt in Kew Bull. 30:301 (1975).

398 **Borreria chaetocephala** (DC.) Hepper should now be known as *Spermacoce chaetocephala* DC. See discussion by Verdcourt in Kew Bull. 30:301 (1975).

401 **Galium spurium** L. var. **echinospermum** (Wallr) Desportes has now had its African species referred to *G. spurium* subsp. *africanum* Verdc. See Verdcourt in Kew Bull. 30:324 (1975). However on recent cytological evidence Dr Verdcourt has now expressed the opinion that the subspecies might be better placed in *G. aparine* L.

402 **Galium thunbergianum** Ecklon & Zeyher. The Jebel Marra specimens have now been referred to *G. thunbergianum* var. *hirsutum* (Sond.) Verdc. See Verdcourt in Kew Bull. 30:326 (1975).

408 **Mitracarpus scaber** Zucc. should now be known as *M. villosus* (Sw.) DC. See Verdcourt in Kew Bull. 30:317 (1975) for discussion regarding this pantropical species.

412 **Oldenlandia echinulosa** K. Schum. should now be known as *O. pellucida* Hiern var. *echinulosa* (K. Schum.) Verdc. See Verdcourt in Kew Bull. 30:292 (1975).

680 **Nervilia kotschy** (Reichenb.f.) Schlechter. In the course of a revision of this genus my colleague Dr P. J. Cribb has found that *Wickens* 1805 represents a mixed gathering, with the inclusion of *N. abyssinica* (Chiov.) Schlechter (*Wickens* 1805A), a species otherwise known only from Ethiopia, except for one unconfirmed record (inflorescence only, no leaf) from the southern provinces of the Sudan.

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Fig. 35 Panorama of the Jebel Marra massif viewed from the south-west. Drawn by a Graphomat automatic plotting machine at Zuse K. G., Bad Hersfeld, Germany, from data supplied by the Survey Section of the U.N.S.F. Jebel Marra Project.



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Appendix A

Notes on collectors from the Jebel Marra area

The collectors are listed in chronological order. Many of these collectors have been contacted personally and I am grateful to the Sudan Government British Pensioners' Association for supplying many of the addresses. Useful publications prepared by or relevant to the collectors are also cited (see pages 194–198 for references).

Purdy, Colonel E. S. Commander of the Egyptian Military Expedition to Darfur in 1875–76. His collections are obviously from the semi-arid area, although there is no data on the sheets beyond 'Expedition Purdy'; most of his material has been duplicated by Pfund (*q.v.* below).

COLLECTION The bulk of his collection is at Cairo, with some duplicates at Kew and Paris.

PUBLICATIONS Hill, R. (1967); Wickens, G. E. (1970).

Pfund, J. The first botanist to visit Darfur. Accompanied the Egyptian Military Expeditions to Kordofan and Darfur in 1875–76. He died at El Fasher in 1876 before he was able to visit the Jebel Marra massif.

COLLECTION At Cairo, with duplicates at Kew and Paris. His plant collection from Darfur is either from the north or to the east of our area. Neither Pfund's nor Purdy's collections have been cited in this work.

PUBLICATIONS Friederichsen, L. (1878); Zarb, J. H. (1879); Wickens, G. E. (1970).

Lynes, Admiral H. An ornithologist who made two collecting trips to Darfur in 1920 and 1921–22. His plant collections were the first from Darfur since those of Purdy and Pfund. He was also the first person to collect plants from Jebel Marra; his collections contain a number of type specimens. His itineraries are given in detail because they can assist in localizing some of the Kew duplicates which have either inaccurate or missing data.

First visit. In 1920 he was accompanied by a **Mr Cecil McConnell**, but they were forced to curtail their visit when McConnell was recalled to England. Their itinerary was as follows:

11 March 1920	Arrived at El Fasher from El Obeid.
12–23 March	At El Fasher.
24–31 March	El Fasher—Tawila (Bir Tawil)—Melemm (Khor Mellum)—Jebel Gabra (Abu Gabra)—Jebel Dawis (Darweis)—Dibbis—Kalokitting.
1–14 April	At Kalokitting, with a visit to the Deriba Crater.
15–27 April	Kalokitting—El Fasher (route as for 24–31 March).
28 April–4 May	At El Fasher.
5 May	Leave for El Obeid.

Second visit. In 1921 he was accompanied by **Mr Willoughby Lowe**; their itinerary was as follows:

30 Jan 1921	Arrived at El Fasher from El Obeid.
1–8 Feb	At El Fasher.
9–17 Feb	El Fasher—Wadi el Ku (Wadi el Ko)—Tawila—Tarni (Tarna Wells)—Jebel Tia—Kurra.
18–24 Feb	At Kurra.
25–27 Feb	Kurra—Nuringya (Niurnya).
28 Feb–19 March	At Nuringya, with trips to the surrounding

20–31 March	hill tops (3000 m). Nuringya—Lewing—Dar Murri (Murree)—Arga (Aga)—Kalokitting.
1–20 April	At Kalokitting.
21 April–5 May	Visit to the southern and south-eastern heights of the Jebel Marra massif, up to 3000 m.
6–8 May	At Kalokitting.
9–15 May	Kalokitting—Dibbis—Duggu—Ara—Ubbe—Durri—Zalingei.
16 May–3 June	At Zalingei, with visits to Bella and Kulme.
5–26 June	At Kulme.
27 June–2 July	At Zalingei.
3 July–19 Aug	At Kulme.
20 Aug–9 Sept	At Zalingei.
10 Sept–1 Oct	At Kulme.
2 Oct–11 Nov	At Zalingei.
12–16 Nov	Zalingei—Durri—Nasap—Umm Haraz—Kerefeina—Koron (Kebon)—Nuringya.
17–21 Nov	At Nuringya.
22 Nov–13 Dec	Visits to the central and south-western plateau and Deriba Crater.
14 Dec–1 Jan 1922	At Nuringya, with final visit to the central plateau.
2–12 Jan	Nuringya—Kusuru (Kossore)—Dulikonga—Turra—Farei—Burrei (Borei)—Forei—Jebel Ula (J. Oula)—Kurra.
13–16 Jan	Kurra—Tina—Tawila—El Fasher.
17–31 Jan	At El Fasher.
1–9 Feb	El Fasher—Mellit—Saiyah (Sayah)—Madu—Meidob.
10–20 Feb	Meidob, with visits to the Malha Crater and Sureif (Sereif).
21–28 Feb	Meidob—Madu—Saiyah—Mellit—El Fasher.
1–6 March	At El Fasher.
7 March	Leave for El Obeid.

COLLECTIONS At the British Museum (Nat. Hist.) with some duplicates at Kew. The first collection is not numbered. For the second collection block numbers have been allocated, 1–197 (Jebel Marra massif); 300–369 (east of Jebel Marra); 500–635 (west of Jebel Marra, Zalingei and Kulme). The block numbers 300–369 have not been included in this check list. The first collection has been listed by Lester-Garland (1921), the second has been partially listed by Norman (1924).

A number of new species have been described from these two collections. They are:

HAEMANTHUS LYNESII Stapf in Bot. Mag. t. 8975 (1923). Type: *Lynes* s.n. (K, holo.!).

SILENE LYNESII Norman in Journ. Bot. 59:135 (1924). Type: *Lynes* 105b (BM, holo.!).

CROTALARIA LYNESII Baker f. & Martin in Journ. Bot. 59: 136 (1924). Type: *Lynes* 120b (BM, holo.!).

RHYNCHOSIA LYNESII Baker f. & Martin in Journ. Bot. 59: 137 (1924). Type: *Lynes* 87a (BM, holo.!).

COLEUS DARFURENSIS R. Good in Journ. Bot. 59: 138 (1924). Type: *Lynes* 4c (BM, holo.!).

LOBELIA TRIERARCHI R. Good in Journ. Bot. 59: 139 (1924). Type: *Lynes* 126 (BM, holo.!).

BISERRULA PELECINUS L. var. **SUBINTEGRA** *Baker f.*, Leg. Trop. Afr. 271 (1929). Type: *Lynes* 123 (BM, holo.!, K, syn.!).
ERYTHRINA SUDANICA *Baker f.*, Leg. Trop. Afr. 2: 371 (1929). Type: *Lynes* 564 (BM, holo.!).
ANTHEPHORA LYNESII *Stapf & Hubbard* in Fl. Trop. Afr. 9: 938 (1930). Type: *Lynes* 627 (K, holo.!).
GNAPHALUM MARRANUM *Philipson* in Journ. Bot. 75: 317 (1937). Type: *Lynes* 55b (BM, holo.!).
PLECTRANTHUS JEBEL-MARRAE *Wickens & Mathew* in Kew Bull. 25: 255 (1971). Type: *Lynes* 589 (BM, holo.!).

PUBLICATIONS *Lynes*, H. (1921); *Lester-Garland* (1921); *Thomas*, O. & *Hinton*, M. A. C. (1923); *Lynes*, H. (1924); *Norman*, C. (1924); *Good*, R. (1924).

Rugman, Mrs (now Lady) C. The wife of Sir Francis Rugman, Financial Secretary to the Sudan Government. In 1929 she ascended Jebel Marra from Kronga and visited the Deriba Crater. COLLECTION A small collection, at Kew.

Macintosh, Mrs D. O'H. Accompanied by her husband, then a District Commissioner at Nyala, she visited Jebel Marra during May 1930. She is believed to be the first European woman to have crossed the massif. COLLECTION A small collection, at Kew.

Sandison, P. Assistant Resident, Zalingei from May–November 1931, Acting Resident from November 1931 to November 1932 and Assistant Resident from November 1932 to 1935. Collected from the Jebel Marra massif during his stay at Zalingei. COLLECTION A small collection, at the British Museum (Nat. Hist.). PUBLICATION *Sandison* (1936).

Steele, Miss M. A wealthy and rather eccentric amateur collector and traveller, chiefly interested in insects but made a small collection of plants when she visited Jebel Marra during April–June 1932. The altitudes given on her labels are usually inaccurate. COLLECTION A small collection, at Kew.

Dandy, J. E. A botanist at the British Museum (Nat. Hist.). Accompanied by **Dr D. Skilbeck** from Wye College, he spent nine days on Jebel Marra during January 1934. COLLECTION A small but valuable collection at the British Museum (Nat. Hist.), a small proportion of which was destroyed by fire during World War II.

Drar, Dr M. Curator of the Fouad I Agricultural Museum, Dokki, Egypt from 1930 until his death in 1964. He visited Kordofan and Darfur during 1938 accompanied by his technical assistant, **Mohammed El Mahdi**. The relevant portion of his itinerary is as follows:

6–7 May 1938	At El Fasher.
8 May	El Fasher—Kebkabiya (Kabb Kabi).
9 May	Kebkabiya—Guldo.
10 May	Guldo—Jebel Marra, Wadi Buri.
11 May	Jebel Marra, ?Yorna—locality not traced.
12 May	Jebel Marra, Wadi Asari (Saria).
13 May	Jebel Marra, ?Kronga (Korana).
14 May	Jebel Marra, ?Norna (= ?Yorna), locality not traced.
15 May	Jebel Marra, Dar Murri (Marri).
16 May	Kibi (Kabe).
17 May	Zalingei.

COLLECTION 594 species from Kordofan and Darfur at the Agricultural Museum, Cairo, with a duplicate set in the Cairo University Herbarium. A few duplicates also at Kew. PUBLICATION *Drar* (1970).

Aglen, Mrs P. Accompanied by her husband, then a District Commissioner at El Fasher, Mrs Aglen spent a week's leave on the Jebel Marra massif during June–July 1947. COLLECTION A small collection, at Kew.

Harrison, M. N. Pasture Research Officer, Department of Animal Production. He collected throughout the Sudan and visited the eastern plains of Darfur in 1947, but apparently did not collect from the Jebel Marra massif. COLLECTION Khartoum with some duplicates, mainly grasses, at Kew. PUBLICATIONS *Harrison* (1955); *Harrison & Jackson* (1958).

Khalid Mohammed Ali. A member of the Forests Department. He collected pteridophytes from Jebel Marra in June 1951. COLLECTIONS University of Khartoum with duplicates at Kew and British Museum (Nat. Hist.). PUBLICATIONS Records included in *MacLeay* (1953, 1955a & b).

Ramsay, Dr D. Mc. Served with the Forests Department in Darfur from 1951 to 1953, during which period he made several visits to Jebel Marra. COLLECTIONS Believed to be in Khartoum, very few specimens at Kew. PUBLICATION *Ramsay* (1958)—the text of a Ph.D. thesis at Edinburgh, less field data.

Jackson, J. K. Formerly Silviculturalist, Forests Department, later FAO Forestry Advisor to the Sudan. He paid several visits to Jebel Marra. His main itineraries were as follows:

8–16 Jan 1953	El Fasher—Shingil Telbai—Nyala—Zalingei—Nyertete—Wadi Burrorro—Kibi (Kebe)—Kronga (Kerinka)—Deriba—Sunī—Jebel Uwo (J. Ufuwo)—El Fasher.
29 Nov–10 Dec 1954	Daein—Abu Matariq—Buraam—Nyala—Meleemm—Sunī—Digile Valley—Jebel Uwo (J. Ufuwo)—Deriba—Tora Tonga (Taurotonga)—Sunī—El Fasher.
3–4 Nov 1957	Across Jebel Marra from Gandatour to Deriba and out to the north.
10–15 Sept 1960	Golol—Gandatour—Tora Tonga and return.

COLLECTIONS Nos. 2507–2657; 3272–3390; 3870–3882 and 4040–4077. The majority of these are at Kew, a few woody specimens are at Oxford and the ferns are either at the British Museum (Nat. Hist.) or at Khartoum University. Duplicates at Khartoum (Forests Department Herbarium). PUBLICATION *Harrison & Jackson* (1958).

MacLeay, Professor K. N. G. Professor of Botany, University of Khartoum. Accompanied by **Professor J. H. Lebon**, they visited Jebel Marra in 1956. COLLECTION No specimens seen, presumed to be in Khartoum University. PUBLICATIONS *MacLeay* (1953, 1955a & b).

Poulsen, G. Conservator of Forests, Western Division from 1956 to 1963 during which period he was responsible for the development of forestry plantations on Jebel Marra. From 1963 to 1965, Forestry Officer to the United Nations Special Fund Jebel Marra Project. COLLECTIONS A small collection at Khartoum (Forests Department Herbarium) and Montpellier.

Gillet, Dr H. At the time of his visit an assistant at the Museum National d'Histoire Naturelle, Paris. He paid a brief visit to Jebel Marra from Chad during October–November 1957. COLLECTION Paris, not seen. PUBLICATION *Gillet* (1957).

Robertson, V. C. Team leader and ecologist from Hunting Technical Services Ltd, during the initial reconnaissance investigations into the agricultural potential of the Jebel Marra Project area. Other team members included **D. F. Francis** (forester), **A. N. Burton & D. O. Hughes** (geologists). Field studies carried out from October 1957 to February 1958. COLLECTIONS Robertson 1–156, Francis 1–87, both at Kew. PUBLICATIONS Hunting Technical Services (1958); Lebon & Robertson (1961); Robertson (1965).

Bruneau de Miré, Ph. Commissioned by the Comité International de Lutte Biologique to visit Jebel Marra in order to collect olive specimens for parasite studies. Stayed for nearly ten days on Jebel Marra during 1959.

COLLECTION Not located.

PUBLICATIONS Bruneau de Miré (1960); Bruneau de Miré & Quézel (1961).

Pettet, Dr A. Lecturer at the Department of Botany, University of Khartoum from 1962 to 1967. Made three collecting trips to Jebel Marra in December 1962 & 1964 and again with **Professor Kassas** in 1965–66. Apart from the first collection he concentrated on bryophytes.

COLLECTION At Kew (Angiosperms).

PUBLICATIONS Notes on the bryophytes are intended to be published in the Trans. Brit. Bryol. Soc.

Blockhuis, W. A. A soil scientist stationed at Wad Medani. He visited the Jebel Marra area in January 1962.

COLLECTION Nos. 85–136, at Wageningen.

I am grateful to Professor H. C. D. de Wit for this information.

Blair, I. J. FAO Livestock and Pasture Adviser with the United Nations Special Fund Jebel Marra Project from May 1963 to September 1964. Based at Nyertete and collected throughout the area, often accompanied by **G. E. Wickens** (*q.v.* below).

COLLECTIONS 1–261, mainly grasses, with a few legumes, at Kew with some duplicates at the University of Khartoum.

PUBLICATION Blair (1964).

Wickens, G. E. Team leader and ecologist from Hunting Technical Services Ltd and employed on the United Nations Special Fund Jebel Marra Project for the periods January to November 1964 and February to July 1965. Based at Zalingei and made numerous collecting trips throughout the entire project area. Itineraries as follows:

11–14 Jan 1964	El Obeid—En Nahud—Umm Keddada—El Fasher—Kebkabiya—Zalingei (by road).
15–17 Jan	At Zalingei.
18–25 Jan	At Nyertete.
26 Jan–2 Feb	Zalingei and environs.
3 Feb	Zalingei—Deleig—Garsila—Arwala and return.
4–7 Feb	At Zalingei.
8–15 Feb	Zalingei—Nyertete—Golol—Kalokitting—Gandatour—Tora Tonga—Deriba Crater—Tora Tonga—Gandatour—Kalokitting—Nyertete—Zalingei.
16–17 Feb	Zalingei—Kas—Nyala and return.
18–23 Feb	At Zalingei.
24–25 Feb	Zalingei—Nyertete—Golol—Saur—Golol—Zalingei by helicopter.
26 Feb–10 March	Zalingei and environs.
11–22 March	At Khartoum.
23–25 March	At Zalingei.
26 March	Zalingei—Farni Karni—Zalingei.
27 March–1 April	At Zalingei.
2–12 April	Zalingei—Kas—Jebel Gabra—Melemm—Suni—Kelling—Suni—Melemm—Tarni—Martal—Jebel Tia—Jebel Au—Kusuru—Turra—Guldo—Gorgor—Zalingei.

13 April–2 May
3–7 May

8–10 May
11–15 May

16–17 May
18–21 May

22–25 May
26–30 May

1–2 June
3–24 June
25 June–5 July
6–15 July

16–18 July
19 July

20–24 July
25 July
26 July

27 July–11 Aug
12–26 Aug

27 Aug–6 Sept
7–10 Sept

11 Sept
12–25 Sept

26 Sept–13 Oct
14 Oct

15 Oct

16 Oct–1 Nov
2–7 Nov

7–14 Nov
15 Nov
13 Feb 1965
13 Feb–3 March
4–8 March
9–17 March

18–29 March
30 March–1 April
2–19 April
20–22 April

23 April
24–29 April

30 April–6 May

Zalingei and environs.

Zalingei—Nyertete—Mortagello—Golol—Saur—Golol—Mortagello—Nyertete—Kibi—Gallaba—Zalingei.

At Zalingei.

Zalingei—Deleig—Mugjar—Garsile—Kweira—Garsila—Zalingei.

At Zalingei.

Zalingei—Murundu—Dereisa—Sirri—Eremsa—Kortolonga—Tonga—Amballa—Tarabo—Foro Burunga—Mogororo—Foro Burunga—Wadi Debarei—Sabirta—Ngorra Fata—Eremsa—Dereisa—Baraka—Buguj—Habla—Naye—Murnei—Sullu—Kurgula—Zalingei.

At Zalingei, with a visit to Jebel Sirmi.

At Nyertete, with helicopter trips to the high plateau of the Jebel Marra massif.

At Zalingei.

At Khartoum and Beirut.

At Zalingei, with a visit to Jebel Sirmi.

Zalingei—Nyertete—Kronga—Guldo—Golo—Jebel Kelling—Golo—Guldo—Nyertete—Mortagello—Golol—Saur—Golo—Mortagello—Nyertete—Zalingei.

At Zalingei.

Zalingei—Abu Dima—Zalingei, by helicopter.

Zalingei and environs.

Zalingei—Gallabat—Zalingei.

Zalingei—Wadi Azum/Saleh confluence—Umm Jumeina—Zalingei, by helicopter.

At Zalingei, with a visit to Jebel Sirmi.

Zalingei—Nyertete—Mortagello—Nyertete—Beldong—Nyertete—Zalingei, by horse and camel as motor roads impassable.

At Zalingei, with a visit to Jebel Sirmi.

At Nyertete, with helicopter trip to the high plateau of the Jebel Marra massif.

At Zalingei.

Zalingei—Golol—Kalokitting—Gur Lambang—Tora Tonga—Wadi Keyla—Suni—Nuringya—Kronga—Nyertete—Zalingei.

At Zalingei, with a visit to Jebel Sirmi.

Zalingei—Tullu—Murnei—Zalingei by helicopter.

Zalingei—Kelling—Jebel Au—Suni—Zalingei by helicopter.

Zalingei and environs.

Zalingei—Nyertete—Golol—Kalokitting—Jebel Teringa—Gubbo—Gur Lambang—Tora Tonga and return.

Zalingei and environs.

Zalingei—Khartoum.

Arrive Zalingei.

Zalingei—Kalia—Zalingei.

At Zalingei.

Zalingei—Golol—Mortagello—Beldong—Kronga—Kebali—Kelling—Golo—Guldo—Nyertete—Zalingei.

Zalingei and environs.

Zalingei—Inderabiro—Murnei—Zalingei.

Zalingei and environs.

Zalingei—Nyertete—Beldong—Deriba and return.

At Zalingei.

Zalingei—Deleig—Garsila—Mugjar—Karraro—Guldubar—Kubbum—Mugjar—Dulmoinya—Mugjar—Garsila—Amballa—Dereisa—Zalingei.

Zalingei and environs.

7 May	Zalingei—Kurgula—Zalingei.
8–12 May	At Zalingei.
13–19 May	Zalingei—Nyertete—Golol—Nyertete— Kalokitting—Zalingei.
20–31 May	Zalingei and environs.
1–8 June	Zalingei—Gur Lambang—Jebel Gabra— Melemm—Tarni—Martal—Jebel Tia— Rokirroh—Kebeleh—Rokirroh—Turra— Ajja—Turra—Guldo—Zalingei.
9 June–7 July	Zalingei and environs.
8 July	Zalingei—Khartoum.

COLLECTIONS Nos. 960–3009 at Kew, with duplicates at the University of Khartoum.

PUBLICATIONS Burton & Wickens (1966); Wickens (1966); Radwanski & Wickens (1967); Hunting Technical Services (1968); Wickens (1969a & b, 1970, 1971, 1975 a, b & c and 1976a & b in press); Wickens & Collier (1971).

De Wilde, W. J. J. O. A botanist from the Landbouwhogeschool, Wageningen visited the Jebel Marra area during the period 19–31 January 1965 while enroute from Cameroon to Ethiopia. He was accompanied by his wife, **Mrs B. E. E. de Wilde-Duyfjes** and his brother, **Dr J. J. F. E. de Wilde**.

COLLECTION Nos. 5357–5640, at Wageningen.

I am grateful to Professor H. C. D. de Wit for this information.

Sir John Cass College Expedition (leader **Miss L. McGowan**).

A hydrobiological survey carried out by five postgraduate students accompanied by **Mr D. Hammerton**, Hydrobiological Research

Officer, University of Khartoum, visited the Jebel Marra area during November and December 1964. They studied the fauna and algal flora as well as carrying out physio-chemical studies and making a bathymetric survey of the Deriba Crater Lakes.

COLLECTIONS University of Khartoum and British Museum (Nat. Hist).

PUBLICATIONS Cloudsley-Thompson (1966 & 1967); Happold (1966a & b); Hammerton (1966, 1968 & 1969).

University of Khartoum Expedition (leader **Professor M. Kassas**). A team from the Botany Department visited Jebel Marra in December 1965.

COLLECTIONS University of Khartoum and Cairo University.

PUBLICATIONS Karim (1968); Fott & Karim (1973). Professor Täckholm is preparing a check list of the Kassas collections. I have seen a draft copy and have included many of his records in the check list (see Introduction, p. 81).

Sahni, Dr K. C. FAO Forestry Advisor, visited Jebel Marra in October 1966.

COLLECTIONS A small collection at Kew and Khartoum.

PUBLICATION Sahni (1968).

Quézel, Professor P. Professor of Botany, University of Marseille, accompanied a French expedition to Darfur during August and September 1967. Unable to reach Jebel Marra they explored its northern outlier, Jebel Gurgeil.

COLLECTIONS University of Marseille, with a few grasses at Paris.

PUBLICATIONS Quézel (1968, 1969 & 1970).

Appendix B

Gazetteer

The spelling of the place names given in this gazetteer is that used for the Sudan 1 : 250,000 map sheets 55-L Kereink, 53-P Zalingei, 54-I El Fasher and 54-M Nyala. Fur is not a written language, hence the spelling is not necessarily correct. As an indication of the uncertainty of the spelling, Kibi (sheet 54-I) is also spelt Kebe (sheet 53-L). Neither is it always certain whether a place name should be recognized as such or whether it was originally used as

a description of a place and has been taken up by the surveyor. As an example Saur, near Golol, simply means ‘waterfall’, although the Forests Department and others have accepted it to mean the actual locality. Sandison (1936) has produced an excellent vocabulary of Fur and Arabic words, a selection of some of the more common geographical terms are listed below.

Fur		
Singular	Plural	
baw		pool or lake
daari	daaringa	enclosure (= zeriba <i>Arabic</i>)
deeto	kitonga/kidonga	rock
dúlú	kulang	deserted village (= bobaiya <i>Arabic</i> – this may be Lynes’s ‘Bobbery’)
fugu	fugunga	hill
fugungang taas		plain between hills
gnorra		small, solitary hill
illa	illanga	village
kiling	kilinga	edge of a watercourse
kóro gyeeli		stream
lolung	lolunga	river
madil	madila	river (wadi)
matil	matila	valley
mitil	mitila	river (wadi)
roo	roonga	river (wadi) or valley
saur		a waterfall
suuni	suuninga	shallow well
taaru	taaronga	large boulder
taarunga		composed of boulders
tawra		outside, a flat open space, a mud pan
tawta		pool or lake
tirge	tirgenga	stone wall
tong	tonga	house
utumo		to build (grass huts) – hence the locality Kutum
uyor		bank of a river where the soil is covered by sand and unfit for cultivation
warra		small, solitary hill

Gazetteer Locality	Latitude	Longitude	Altitude
Abu Dima: region	c 12° 30' N	23° 30' E	1280 m
Abau, Jebel Marra—see Jebel Aba-U	13° 01' N	24° 21' E	2956 m
Ajja: village	c 13° 18' N	24° 18' E	
'Amar Gedid: village	13° 06' N	23° 54' E	850 m
Amballa: village and lake	12° 17' N	22° 44' E	790 m
Ara: village	12° 50' N	23° 45' E	
Arga: village	12° 46' N	24° 09' E	
Arwala: township	12° 21' N	23° 17' E	975 m
Babrei, Jebel Marra—near Tora Tonga			
Badi, Jebel Marra: village	12° 54' N	24° 10' E	
Baraka: village	12° 47' N	22° 46' E	885 m
Beldong, Jebel Marra: village	12° 57' N	24° 10' E	c 1300 m
Beldong, Jebel Marra, Forest Reserve	12° 57' N	24° 10' E	c 1830 m
Bella: village	12° 33' N	23° 21' E	
Bir Serafia: village and wells	13° 41' N	25° 02' E	
Bobbery, Jebel Marra: ?ruined village			
Borrei, Jebel Marra:			
Buguj: village	12° 45' N	22° 43' E	885 m
Burei: village	12° 56' N	23° 30' E	1020 m
Burrei, Jebel Marra: village	13° 10' N	24° 28' E	
Dar Murri, Jebel Marra: region	c 12° 56' N	24° 08' E	
Daura Hills (Dul el Lahm): inselbergs	12° 21' N	24° 21' E	966 m
Deleig: village and market	12° 29' N	23° 16' E	c 1000 m
Dembilbil, Jebel Marra:			?2500 m
Dereisa: village	12° 41' N	22° 46' E	885 m
Deriba Crater, Jebel Marra: crater lakes	12° 58' N	24° 16' E	2290 m
Dibbis: village	12° 33' N	24° 14' E	1020 m
Digile Valley, Jebel Marra: stream	13° 02' N	24° 42' E	c 2450 m
Dilu, Jebel Marra:			
Dimbilbil (Dembilbil), Jebel Marra:			?2500 m
Dodo: village	12° 54' N	23° 25' E	c 1000 m
Duggu: village	12° 47' N	23° 50' E	
Dul el Lahm, Daura Hills: inselberg	12° 21' N	24° 21' E	966 m
Dulmoinya: village	12° 03' N	22° 52' E	
Dunbilbil (Dembilbil), Jebel Marra:			?2500 m
Durri: village	12° 46' N	23° 34' E	
Ebe, Jebel Marra:			2800 m
El Fasher: town and provincial headquarters	13° 37' N	25° 21' E	744 m
Eremsa: village	12° 31' N	22° 49' E	
Farni Karni: village	12° 42' N	23° 34' E	
Fatna Karan: village			1130 m
Forei, Jebel Marra: village	13° 13' N	24° 24' E	
Foro Burunga: village	12° 07' N	22° 36' E	c 600 m
Gallaba, near Kibi: village	13° 02' N	24° 04' E	
Gallabat: Forest Reserve	12° 43' N	23° 25' E	c 1000 m
Gandatour, Jebel Marra: village	c 12° 50' N	24° 18' E	1525 m
Garsila: township	12° 22' N	23° 08' E	945 m
Golo, Jebel Marra: village and market	13° 10' N	24° 15' E	1675 m
Golol, Jebel Marra: Forest Reserve	12° 55' N	24° 08' E	1340 m
Gorgor: village	13° 05' N	23° 53' E	
Gubbo, Jebel Marra: village and market	12° 47' N	24° 27' E	1525 m
Guldo, Jebel Marra: township	13° 08' N	24° 09' E	1280 m
Guldubar: village	12° 06' N	23° 45' E	
Gulobei, Jebel Marra: village and volcanic plug	12° 54' N	24° 22' E	2450 m
Gur Lambang, Jebel Marra: village and Forest Reserve	12° 51' N	24° 23' E	1900 m
Habila: village	12° 41' N	22° 34' E	900 m
Hami (Rotoki): hot spring	12° 17' N	24° 13' E	
Inderabiro: village and Forest Reserve	12° 29' N	22° 40' E	790 m
Jawa, Jebel Marra: village	13° 02' N	24° 29' E	1650 m
Jebel Aba-U, Jebel Marra: volcanic peak	13° 01' N	24° 21' E	2956 m
Jebel Au, Jebel Marra: volcanic plug	13° 17' N	24° 25' E	

Locality	Latitude	Longitude	Altitude
Jebel Auli, Jebel Marra: volcanic peak	12° 47' N	24° 33' E	1464 m
Jebel Badi, Jebel Marra: village and volcanic peak	12° 54' N	24° 10' E	
Jebel Baggarat:	14° 34' N	26° 47' E	
Jebel Dawis: quartz ridge	12° 34' N	24° 21' E	
Jebel Daura (Daura Hills): inselberg	12° 21' N	24° 21' E	966 m
Jebel Dersi, Tebella Massif:	12° 21' N	22° 57' E	1135 m
Jebel Dito Dilla: inselberg	12° 51' N	22° 42' E	
Jebel Fadilli, W. piedmont: volcanic cone	13° 04' N	24° 05' E	
Jebel Fugri, W. piedmont: volcanic cone	12° 50' N	24° 04' E	1354 m
Jebel Gabra, W. piedmont: volcanic cone	12° 44' N	24° 42' E	
Jebel Fofò:	12° 55' N	22° 47' E	
Jebel Gasgadouk:	12° 53' N	22° 41' E	
Jebel Gurgeil, Jebel Marra, northern outlier	13° 50' N	24° 19' E	2397 m
Jebel Idwa, Jebel Marra: volcanic cone	12° 59' N	24° 14' E	
Jebel Kelling, Jebel Marra: volcanic plug	13° 05' N	24° 19' E	c 1850 m
Jebel Kirsin Tonga, Jebel Marra: volcanic cone	12° 58' N	24° 21' E	2799 m
Jebel Kondi:	12° 54' N	22° 40' E	
Jebel Korong Tong, Jebel Marra: volcanic peak	13° 02' N	24° 22' E	3004 m
Jebel Langi, Jebel Marra: Nubian sandstone	13° 35' N	24° 36' E	
Jebel Meidob, Meidob Hills: volcanic hills	15° 14' N	26° 30' E	
Jebel Mela, Jebel Marra: volcanic cone			2050 m
Jebel Nami (Turra), Jebel Marra: volcanic peak	13° 15' N	24° 23' E	2113 m
Jebel Nimra, Jebel Marra: volcanic peak	12° 58' N	24° 29' E	
Jebel Nguni:	12° 54' N	22° 39' E	
Jebel Rebke, Zalingei: gneiss hill	12° 54' N	23° 31' E	
Jebel Sirmi, Zalingei: granite hill	12° 52' N	23° 35' E	1220 m
Jebel Tarabo: inselberg	12° 15' N	22° 46' E	847 m
Jebel Teringa: lava flow	12° 39' N	24° 32' E	1130 m
Jebel Tia, Jebel Marra: lava flow	13° 18' N	24° 36' E	
Jebel Torofelli, Zalingei: granite hills	12° 54' N	23° 33' E	
Jebel Ufuwo – see Jebel Uwo			
Jebel Ula, Jebel Marra:	13° 23' N	24° 24' E	
Jebel Uwo (Jebel Ufuwo), Jebel Marra: volcanic peak	13° 02' N	24° 22' E	3024 m
Jebel Walla:	13° 04' N	24° 01' E	
Kagko: village and market	12° 22' N	23° 23' E	
Kalla: saline spring	13° 23' N	23° 47' E	
Kalokitting, Jebel Marra: village	12° 44' N	24° 16' E	1090 m
Karraro: village	12° 02' N	23° 34' E	800 m
Kas: township	12° 30' N	24° 17' E	1020 m
Kebali, Jebel Marra: village and plateau	c 13° 03' N	24° 17' E	2450 m
Kebe – see Kibi			
Kebeleh, Jebel Marra: ancient city	c 13° 16' N	24° 28' E	1500 m
Kebkabiya: township	13° 39' N	24° 05' E	1102 m
Keila: village	12° 52' N	24° 46' E	
Kelling, Jebel Marra: village	13° 05' N	24° 19' E	1920 m
Kerinko, Jebel Marra: (Kronga)	13° 01' N	24° 12' E	
Kerni: pool	12° 09' N	22° 46' E	600 m
Kertum, Jebel Marra: volcanic peak	12° 59' N	24° 19' E	2976 m
Kibi (Kebe): village	13° 02' N	24° 05' E	1100 m
Kidingir, Jebel Marra: village	12° 47' N	24° 35' E	
Kissib, Jebel Marra: village	13° 01' N	24° 10' E	1830 m
Kobara Hills: region	12° 11' N	23° 30' E	
Kongye: village and hills	12° 56' N	23° 30' E	1130 m
Kongyo Hills: region	13° 03' N	23° 19' E	
Korare: Forest Reserve	12° 59' N	23° 35' E	
Korefeina: village	13° 09' N	24° 06' E	
Korei, Jebel Marra:			
Koron, Jebel Marra: village	13° 06' N	24° 17' E	
Koronga – see Kronga			
Kortolonga: village	12° 34' N	22° 47' E	
Kronga, Jebel Marra: village	13° 01' N	24° 12' E	1800 m
Kubbia, Jebel Marra: village	30° 01' N	24° 15' E	
Kubbum: township and market	11° 47' N	23° 47' E	
Kulme: village	12° 35' N	23° 37' E	1100 m
Kurgula: township	12° 46' N	23° 18' E	975 m
Kurra, Jebel Marra: village	13° 17' N	24° 30' E	1600 m
Kurungdillo: village	12° 54' N	23° 36' E	1020 m
Kusuru, Jebel Marra: market	13° 11' N	24° 22' E	1700 m
Kweire: village and Nubian sandstone hills	12° 19' N	23° 06' E	

Locality	Latitude	Longitude	Altitude
Lewing, Jebel Marra: region	c 13° 06' N	24° 10' E	
Madu: wells	14° 36' N	26° 01' E	
Malha, Meidob Hills: crater	15° 08' N	26° 12' E	
Martal: village	13° 20' N	24° 44' E	950 m
Meidob Hills: volcanic hills	15° 14' N	26° 30' E	
Melemm: village and market	12° 55' N	24° 52' E	900 m
Mellit: village	14° 08' N	25° 33' E	
Mogororo: village	12° 01' N	22° 28' E	700 m
Mortagello, W. piedmont: Forest Reserve	12° 56' N	24° 04' E	1 160 m
Mu'allaqa: village	13° 28' N	23° 57' E	
Mugjar: village	11° 58' N	23° 17' E	730 m
Murnei: township and market	12° 57' N	22° 52' E	900 m
Murundu: village	12° 48' N	23° 09' E	
Nayei: village	12° 50' N	22° 40' E	
Ngorra Fata: village	12° 17' N	22° 52' E	
Nuringya, Jebel Marra: region	c 13° 04' N	24° 20' E	1850 m
Nyala: town and railway terminal	12° 03' N	24° 53' E	673 m
Nyama, S. piedmont: village and market	12° 45' N	24° 10' E	
Nyertete, W. piedmont: village	12° 58' N	24° 04' E	1 160 m
Robo, Jebel Marra: ?river			
Rokirroh, Jebel Marra: market	13° 17' N	24° 27' E	1400 m
Rotoki – see Hami			
Sabirta: village	12° 17' N	22° 57' E	
Saiyah: village	14° 18' N	25° 45' E	
Saur, Jebel Marra: volcanic cone and waterfall	12° 56' N	24° 12' E	2211 m
Saur, Jebel Marra: Forestry Nursery	12° 55' N	24° 12' E	1765 m
Seraf Boiya: Forest Reserve	12° 38' N	23° 19' E	
Sirri: village	12° 32' N	22° 54' E	
Sullu: village	12° 51' N	23° 07' E	c 1000 m
Suni, Jebel Marra: village	13° 02' N	24° 25' E	1780 m
Sureif: springs	15° 24' N	28° 28' E	
Tarabo: village	12° 17' N	22° 45' E	
Tarni: wells	13° 18' N	24° 51' E	945 m
Tawila: village	13° 30' N	24° 53' E	
Tebella Massif: region of granite hills	12° 46' N	23° 00' E	
Tereng (Filingna), Jebel Marra: volcanic peak	12° 59' N	24° 20' E	2950 m
Tereng, Jebel Marra: ash plateau	12° 58' N	24° 21' E	2450 m
Tina: village	13° 29' N	24° 46' E	
Tongo: village	12° 32' N	22° 43' E	
Tora Tonga, Jebel Marra: Forest Reserve	12° 55' N	24° 18' E	2300 m
Toura Tonga – see Tora Tonga			
Tululu: village and market	12° 47' N	23° 11' E	1040 m
Tur: village and market	c 12° 52' N	24° 07' E	
Turra, Jebel Marra: village and sultan's tombs	13° 15' N	24° 20' E	1600 m
Ubbe: village	12° 51' N	23° 41' E	
Umm Haraz: village	11° 59' N	23° 14' E	750 m
Umm Haraz: village	13° 09' N	24° 00' E	
Umm Jameina: village	12° 44' N	23° 01' E	900 m
Wadi Abwo, Jebel Marra:			
Wadi Amer, Jebel Marra:	12° 54' N	24° 26' E	
Wadi Ara – see Wadi Gellimi			
Wadi Aribi:	12° 53' N	23° 31' E	
Wadi Asari, Jebel Marra:	12° 50' N	24° 16' E	
Wadi Au, Jebel Marra:	13° 18' N	24° 28' E	
Wadi Azum:	12° 22' N	22° 42' E	
Wadi Bala:	12° 59' N	24° 04' E	
Wadi Barei:	13° 26' N	24° 04' E	
Wadi Bulbul:	12° 48' N	24° 24' E	
Wadi Buri:	13° 11' N	24° 04' E	
Wadi Burorro:	12° 55' N	24° 02' E	
Wadi Debarei:	12° 11' N	22° 55' E	
Wadi Faigili, Jebel Marra:	12° 56' N	24° 18' E	
Wadi Gellimi (Wadi Ara):	12° 55' N	23° 37' E	

Locality	Latitude	Longitude	Altitude
Wadi Gendi:	12° 41' N	24° 12' E	
Wadi Geraa:	12° 43' N	24° 06' E	
Wadi Golol:	12° 54' N	23° 50' E	
Wadi Golol:	12° 51' N	24° 07' E	
Wadi Gulobei – see Wadi Bulbul:			
Wadi Kaja:	12° 05' N	22° 29' E	
Wadi Karoma:	12° 44' N	22° 55' E	
Wadi Keila:	12° 54' N	24° 49' E	
Wadi Keira:	13° 01' N	24° 08' E	
Wadi Kongei:			
Wadi Ku (El Ku):	13° 39' N	25° 12' E	
Wadi Lailonga:	12° 58' N	24° 29' E	
Wadi Leiba:	12° 56' N	24° 40' E	
Wadi Mortagello:	12° 56' N	24° 04' E	
Wadi Nyertete:	12° 58' N	24° 03' E	
Wadi Saici:	12° 36' N	22° 36' E	
Wadi Saleh:	12° 02' N	22° 53' E	
Wadi Saria, Jebel Marra:			
Wadi Sauli:	12° 58' N	23° 49' E	
Wadi Sureif:	13° 04' N	23° 48' E	
Wadi Surra:	13° 00' N	24° 10' E	
Wadi Tarni:	13° 19' N	24° 48' E	
Wadi Turungo, Jebel Marra:	12° 57' N	24° 18' E	
Wadi Urunga:	12° 48' N	24° 09' E	
Walaa, W. piedmont: Forest Reserve	13° 02' N	24° 01' E	1160 m
Zalingei: township and district headquarters	12° 54' N	23° 29' E	1021 m

Appendix C

List of species, with details regarding location and floristic category

<i>Key to Location</i>							<i>Key to Floristic Categories</i>	
1	Jebel Marra, upland grassland	End.	Endemic	Afr.alp.	Afro-alpine Region			
2	Jebel Marra, gallery forest	Cos.	Cosmopolitan	Afr.mont.	Afro-montane Region			
3	Jebel Marra, hill savanna	Hola.	Holarctic	Eth.mont.	Ethiopian montane Sub-Region			
4	Jebel Marra, piedmont savanna	Palae.	Palaearctic	Karoo	Karoo-Namid Region			
5	Lowland savanna	Pantrop.	Pantropical	Sa-Si	Saharo-Sindian Region			
6	Tibesti	Palaeotrop.	Palaeotropical	Sa	Sahara Sub-Region			
		Neotrop.	Neotropical	Sa.mont.	Saharo-montane Domain			
		Trop.mont.	Tropical montane	Si	Sindian Sub-Region			
		S-Z	Sudano-Zambezian Region	D	Deccan Region			
		Sah.	Sahelian Domain	M	Madagascan Region			
		S	Sudanian Domain	Med.	Mediterranean Region			
		A	Afroriental Domain	I-T	Irano-Turanian Region			
		Z	Zambezian Domain	Cent.Eur.	Central European Region			
		SA	South Arabian Domain	Him.	Himalayan Region			
		G-C	Guineo-Congo Region	prefix E/	eastern			
		G	Guinea Domain	prefix W/	western			
		C	Congo Domain	prefix Cult./	cultigen			

	Location						Floristic Category
	1	2	3	4	5	6	
Ranunculaceae							
1 Clematis hirsuta			+	+	+	+	S-Z
2 Clematis simensis	+		+	+			A + Z + Cameroon extension
3 Nigella sativa			+				Cult./I-T
4 Ranunculus multifidus	+		+	+			A + Z + Cameroon extension
Ceratophyllaceae							
5 Ceratophyllum demersum			+				Cos. (aquatic)
Nymphaeaceae							
6 Nymphaea caerulea				+			A + Z (aquatic)
7 Nymphaea lotus					+		Palaeotrop. (aquatic)
8 Nymphaea maculata					+		S-Z + G (aquatic)
Menispermaceae							
9 Chasmanthera dependens					+		S-Z + G
10 Cissampelos mucronata					+		S-Z + G
Turneraceae							
11 Wormskioldia pilosa					+		S-Z
Capparidaceae							
12 Boscia salicifolia					+	+	S-Z
13 Boscia senegalensis				+	+	+	Sah.
14 Cadaba farinosa subsp. farinosa			+	+	+		Sa-Si + Sah. + S + A + SA
15 Cadaba glandulosa					+	+	Sah + S + A + SA
16 Capparis cartilaginea			+			+	Sa-Si + A + Z
17 Capparis decidua					+	+	Sa-Si + Sah.
18 Capparis fascicularis var. fascicularis				+	+		Sah. + A
19 Capparis micrantha			+				A
20 Capparis sepiaria var. fischeri			+		+		Sah. + A
21 Cleome monophylla			+	+	+		Sa-Si + S-Z (weed)
22 Crateva adansonii subsp. adansonii					+		S-Z
23 Gynandropsis gynandra					+	+	Pantrop. (weed)
24 Maerua angolensis			+	+			S-Z
25 Maerua oblongifolia			+		+		Sah. + S + A + SA
26 Maerua pseudopetalosa					+		S + A

	Location						Floristic Category
	1	2	3	4	5	6	
Cruciferae							
27 <i>Capsella bursa-pastoris</i>	+						Afr.mont. + Palae.
28 <i>Farsetia longisiliqua</i>					+		Sah. + A + SA
29 <i>Farsetia stenoptera</i>					+		Sah. + A
30 <i>Lepidium sativum</i>			+				Cult./Med.
31 <i>Nasturtium microphyllum</i>			+				Palae. (aquatic)
32 <i>Nasturtium officinale</i>			+			+	Afr.mont. + Palae.
33 <i>Rhaphanus sativus</i>					+		Cult./Cos.
Polygalaceae							
34 <i>Polygala abyssinica</i>	+		+				Afr.mont. + Him.
35 <i>Polygala arenaria</i>			+	+			S-Z
36 <i>Polygala persicariifolia</i>			+	+			Palaeotrop.
37 <i>Polygala petitiiana</i>			+	+			S-Z
38 <i>Securidaca longepedunculata</i>			+	+	+		S-Z
Crassulaceae							
39 <i>Crassula pentandra</i>	+		+				Afr.mont.
40 <i>Crassula pharnaceoides</i>	+						Sa-Si + S-Z
41 <i>Kalanchoë lanceolata</i> var. <i>lanceolata</i>			+				Sa-Si + S-Z
42 <i>Kalanchoë lanceolata</i> var. <i>glandulosa</i>				+	+		Sa-Si + A
43 <i>Umbilicus botryoides</i>	+						Afr.alp. + Afr.mont.
Vahliaceae							
44 <i>Vahlia dichotoma</i>					+	+	S-Z + M + D
Podostemaceae							
45 <i>Tristicha trifaria</i>			+				Pantrop. (aquatic)
Caryophyllaceae							
46 <i>Arenaria leptoclados</i>	+						Med. + I-T (weed)
47 <i>Cerastium fontanum</i> subsp. <i>triviale</i>	+						Palae. (weed)
48 <i>Cerastium octandrum</i>	+						Afr.alp. + Afr.mont.
49 <i>Drymaria cordata</i>			+	+			Pantrop.
50 <i>Minuatia filifolia</i>	+						Afr.mont.
51 <i>Polycarpaea corymbosa</i>					+		Pantrop.
52 <i>Polycarpaea eriantha</i>				+	+		S-Z
53 <i>Silene burchellii</i>	+						Afr.alp. + Afr.mont.
54 <i>Silene lynesii</i>	+					+	Sa.mont.
55 <i>Silene macrosolen</i>	+						Afr.mont.
Aizoaceae							
56 <i>Glinus lotoides</i>					+	+	Palaeotrop.
57 <i>Glinus lotoides</i> × <i>G. oppositifolius</i>					+		—
58 <i>Zaleya pentandra</i>			+			+	Palaeotrop.
59 <i>Portulaca oleracea</i>			+	+	+	+	Cos. (weed)
Polygonaceae							
60 <i>Oxygonum sinuatum</i>			+		+		E/S-Z (weed)
61 <i>Polygonum aviculare</i>					+		Cos. (weed)
62 <i>Polygonum nepalense</i>	+						Palaeotrop. (weed)
63 <i>Polygonum plebeium</i>					+	+	Palaeotrop. (weed)
64 <i>Polygonum salicifolium</i>	+		+	+	+		Pantrop.
65 <i>Polygonum setulosum</i>	+		+	+	+		S-Z
66 <i>Rumex abyssinicus</i>	+		+				S-Z + M
67 <i>Rumex bequaertii</i>	+		+				Afr.mont. + M (weed)
Illecebraceae							
68 <i>Cometes abyssinica</i>	+						Eth.mont. (Red Sea)
Chenopodiaceae							
69 <i>Chenopodium murale</i> forma <i>albescens</i>	+		+		+	+	Cos. (weed)
70 <i>Chenopodium opulifolium</i>			+				Cos. (weed)
71 <i>Chenopodium schraderanum</i>	+		+			+	A + Z (weed)

	Location						Floristic Category
	1	2	3	4	5	6	
Amaranthaceae							
72 <i>Achyranthes aquatica</i>					+		Palaeotrop.
73 <i>Achyranthes aspera</i>	+		+	+	+		Pantrop.
74 <i>Aerva javanica</i>					+	+	Sa-Si + Sah.
75 <i>Alternanthera nodiflora</i>					+		Palaeotrop. (weed)
76 <i>Alternanthera sessilis</i>				+			Pantrop. (weed)
77 <i>Amaranthus hybridus</i> subsp. <i>hybridus</i>				+		+	Cos. (weed)
78 <i>Amaranthus hybridus</i> subsp. <i>incurvatus</i>				+	+		Pantrop. (weed)
79 <i>Amaranthus spinosus</i>					+		Palaeotrop. (weed)
80 <i>Amaranthus viridis</i>				+	+		Palaeotrop. (weed)
81 <i>Celosia argentea</i>					+		Palaeotrop. (weed)
82 <i>Celosia trigyna</i>			+	+	+		S-Z + M
83 <i>Nothosaerva brachiata</i>					+		S-Z + D
84 <i>Pandiaka heudelotii</i>					+		S
85 <i>Pupalia lappacea</i>			+				Palaeotrop. (weed)
Linaceae							
86 <i>Linum strictum</i> subsp. <i>corymbulosum</i>	+						Med. + I-T
Balanitaceae							
87 <i>Balanites aegyptiaca</i>				+	+	+	Sa-Si + S-Z
Geraniaceae							
88 <i>Erodium malacoïdes</i>	+					+	Med. + I-T
89 <i>Geranium ocellatum</i>	+						Afr. mont. + Him.
90 <i>Monsonia senegalensis</i>			+	+			Sa-Si + S-Z
Oxalidaceae							
91 <i>Biophytum abyssinicum</i>		+		+	+		S-Z
92 <i>Biophytum petersianum</i>				+			Palaeotrop. (weed)
93 <i>Oxalis corniculata</i>			+	+		+	Cos.
94 <i>Oxalis latifolia</i>			+				Pantrop. (weed)
95 <i>Oxalis radicata</i>	+		+				S-Z
Lythraceae							
96 <i>Ammannia auriculata</i>			+	+	+		Pantrop. (weed)
97 <i>Ammannia baccifera</i>			+			+	Palaeotrop.
98 <i>Ammannia priesoreana</i>			+			+	S-Z
99 <i>Ammannia</i> sp. aff. <i>A. senegalensis</i>				+			—
100 <i>Nesaea dodecandra</i>					+		S + A
101 <i>Rotala tenella</i>				+			S-Z
102 <i>Woodfordia uniflora</i>	+		+	+			Afr. mont.
Onagraceae							
103 <i>Epilobium hirsutum</i>	+		+	+			Palae. + A + Z
104 <i>Ludwigia octovalvis</i> subsp. <i>brevisepala</i>					+	+	S-Z
105 <i>Ludwigia stolonifera</i>				+	+		S-Z
Haloragaceae							
106 <i>Laurembergia tetrandra</i> subsp. <i>brachypoda</i>	+						S-Z
107 <i>Myriophyllum spicatum</i>				+			Cos. (aquatic)
Thymelaeaceae							
108 <i>Lasiosiphon kraussianum</i>	+		+	+			S-Z
Nyctaginaceae							
109 <i>Boerhavia coccinea</i>					+	+	Pantrop. (weed)
110 <i>Boerhavia diffusa</i>					+		Pantrop. (weed)
111 <i>Commicarpus africanus</i>			+			+	S-Z + M + Med.
112 <i>Commicarpus pentandrus</i>			+	+			A + Z
Cochlospermaceae							
113 <i>Cochlospermum tinctorium</i>					+		S
Flacourtiaceae							
114 <i>Casearia barteri</i>		+					G-C

	Location						Floristic Category
	1	2	3	4	5	6	
Passifloraceae							
115 <i>Adenia rumcifolia</i> var. <i>rumcifolia</i>		+					G-C + S-Z
116 <i>Adenia venenata</i>			+		+		S + A
Cucurbitaceae							
117 <i>Citrullus lanatus</i>					+		Palaeotrop. (weed)
118 <i>Coccinia adoënsis</i>					+		S-Z
119 <i>Coccinia grandis</i>					+	+	Palaeotrop.
120 <i>Cucumis ficifolius</i>					+	+	E/Sah. + A
121 <i>Kedrostis hirtella</i>		+					S-Z
122 <i>Lagenaria siceraria</i>					+	+	Pantrop.
123 <i>Luffa cylindrica</i>					+		Pantrop.
124 <i>Momordica balsamina</i>					+	+	Pantrop.
125 <i>Momordica charantia</i>					+		Pantrop.
126 <i>Zehneria minutiflora</i>			+				Afr.mont.
127 <i>Zehneria peneyana</i>				+			Sah. + A + M
Cactaceae							
128 <i>Opuntia cochenillifera</i>			+				Cult./Neotrop.
Myrtaceae							
129 <i>Syzygium guineense</i> var. <i>guineense</i>		+					S-Z
Melastomataceae							
130 <i>Derosiphia tubulosa</i>					+		G + W/S
Combretaceae							
131 <i>Anogeissus leiocarpus</i>		+	+	+	+		G + S
132 <i>Combretum aculeatum</i>			+	+	+	+	Sah. + S + A
133 <i>Combretum collinum</i> subsp. <i>binderanum</i>					+		S + A
134 <i>Combretum collinum</i> subsp. <i>hypopilinum</i>				+	+		S
135 <i>Combretum glutinosum</i>			+	+	+		Sah.
136 <i>Combretum molle</i>			+	+	+		S-Z
137 <i>Combretum paniculatum</i>					+		S-Z
138 <i>Guiera senegalensis</i>					+		Sah.
139 <i>Terminalia brownii</i>			+	+	+		E/S + A
140 <i>Terminalia laxiflora</i>				+	+		S
Hypericaceae							
141 <i>Hypericum perforatum</i>	+						Palae.
Tiliaceae							
142 <i>Corchorus olitorius</i>					+	+	Pantrop. (weed)
143 <i>Corchorus trilocularis</i>			+				Palaeotrop.
144 <i>Grewia bicolor</i>			+				Sa-Si + S-Z
145 <i>Grewia flavescens</i>			+	+	+		S-Z + D
146 <i>Grewia mollis</i>			+	+	+		S-Z
147 <i>Grewia tenax</i>					+	+	Sa-Si + S-Z
148 <i>Grewia villosa</i>			+	+	+		S-Z + D
149 <i>Triumfetta annua</i>			+	+	+		Palaeotrop.
150 <i>Triumfetta pentandra</i>			+		+		Palaeotrop.
151 <i>Triumfetta rhomboïdea</i>			+	+			Pantrop. (weed)
152 <i>Triumfetta trichocarpa</i>					+		A + Z
Sterculiaceae							
153 <i>Dombeya quinqueseta</i> var. <i>quinqueseta</i>			+	+	+		S + A
154 <i>Hermannia tigrënsis</i>			+	+			S-Z (weed)
155 <i>Sterculia setigera</i>			+		+		S-Z
156 <i>Waltheria indica</i>				+	+		Pantrop.
Bombaceae							
157 <i>Adansonia digitata</i>			+		+		S-Z
158 <i>Ceiba pentandra</i>			+		+		Pantrop.
Malvaceae							
159 <i>Abutilon angulatum</i>			+				S-Z
160 <i>Azanza garckeana</i>			+	+	+		S-Z

	Location						Floristic Category
	1	2	3	4	5	6	
161 <i>Hibiscus articulatus</i>				+	+		S-Z
162 <i>Hibiscus cannabinus</i>			+		+		Pantrop.
163 <i>Hibiscus lobatus</i>				+	+		Palaeotrop.
164 <i>Hibiscus micranthus</i>			+		+	+	S + Z + D
165 <i>Hibiscus sidiformis</i>					+		S-Z + M
166 <i>Malva verticillata</i>	+		+		+		Cos. (weed)
167 <i>Pavonia hirsuta</i>					+		S-Z
168 <i>Pavonia patens</i>			+	+	+		A + Z
169 <i>Sida alba</i>			+		+		Pantrop.
170 <i>Sida ovata</i>			+	+	+	+	S-Z
171 <i>Sida rhombifolia</i>		+	+	+	+		Pantrop.
172 <i>Sida urens</i>					+		Pantrop.
173 <i>Wissadula rostrata</i>			+		+		S-Z
Euphorbiaceae							
174 <i>Acalypha ciliata</i>			+	+	+		S-Z + D
175 <i>Acalypha crenata</i>			+				S + A
176 <i>Acalypha segetalis</i>				+			S + Z
177 <i>Acalypha villicaulis</i>			+	+	+		S-Z
178 <i>Andrachne aspera</i>			+				Sa-Si + A
179 <i>Bridelia ndellensis</i>		+		+			C + S
180 <i>Bridelia ndellensis</i> × <i>B. micrantha</i>			+				—
181 <i>Bridelia scleroneura</i>				+	+		S + A
182 <i>Croton lobatus</i>					+		S + A + SA + Neotrop.
183 <i>Euphorbia candelabrum</i>			+				S-Z
184 <i>Euphorbia heterophylla</i>			+		+		Pantrop. (weed)
185 <i>Euphorbia hirta</i>			+				Pantrop.
186 <i>Euphorbia nubica</i>	+		+				A
187 <i>Euphorbia polycnemoides</i>			+		+		S-Z (weed)
188 <i>Euphorbia prostrata</i>					+		Pantrop. (weed)
189 <i>Hymenocardia acida</i>					+		S-Z
190 <i>Jatropha curcas</i>					+		Pantrop.
191 <i>Micrococca mercurialis</i>					+		Palaeotrop.
192 <i>Phyllanthus reticulatus</i>			+		+		Palaeotrop.
193 <i>Ricinus communis</i>				+	+	+	Pantrop.
194 <i>Securinega virosa</i>			+	+		+	Palaeotrop.
Rosaceae							
195 <i>Rubus niveus</i>			+				Cult./D + SE Malaya
Caesalpinioideae							
196 <i>Bauhinia rufescens</i>					+		S
197 <i>Cassia absus</i>				+	+		Palaeotrop.
198 <i>Cassia italica</i> subsp. <i>italica</i>					+		Sa-Si + Sah.
199 <i>Cassia mimosoides</i>			+		+		Palaeotrop.
200 <i>Cassia nigricans</i>					+		S-Z + D
201 <i>Cassia obtusifolia</i>			+	+	+	+	Pantrop. (weed)
202 <i>Cassia occidentalis</i>					+	+	Pantrop. (weed)
203 <i>Cassia sieberana</i>					+		S
204 <i>Piliostigma reticulatum</i>			+		+		S
205 <i>Piliostigma thonningii</i>				+	+		S-Z
206 <i>Tamarindus indica</i>				+	+		Palaeotrop.
Mimosoideae							
207 <i>Acacia albida</i>	+		+	+	+	+	S-Z
208 <i>Acacia ataxacantha</i>			+	+	+		S-Z
209 <i>Acacia gerrardii</i> var. <i>gerrardii</i>			+	+	+		S-Z
210 <i>Acacia mellifera</i> subsp. <i>mellifera</i>			+	+	+		E/Sah. + A + SA
211 <i>Acacia nilotica</i> subsp. <i>nilotica</i>					+	+	S
212 <i>Acacia nilotica</i> subsp. <i>adansonii</i>					+		Sah. + A + Sa.
213 <i>Acacia nubica</i>					+		E/Sah. + A + SA extension
214 <i>Acacia polyacantha</i> subsp. <i>campylacantha</i>			+	+	+		S-Z
215 <i>Acacia senegal</i>			+	+	+		Sah. + A
216 <i>Acacia seyal</i> var. <i>seyal</i>			+	+	+	+	W/Sa-Si + Sah + A
217 <i>Acacia sieberana</i> var. <i>sieberana</i>			+	+	+		S-Z
218 <i>Acacia sieberana</i> var. <i>villosa</i>			+		+		W/S
219 <i>Acacia sieberana</i> var. <i>vermoesonii</i>				+	+		A + Z

	Location						Floristic Category
	1	2	3	4	5	6	
220 <i>Acacia sieberana</i> var. <i>sieberana</i> approaching var. <i>villosa</i>					+		—
221 <i>Acacia sieberana</i> sens. lat.					+		—
222 <i>Acacia tortilis</i> subsp. <i>spirocarpa</i>					+		E/S-Z
223 <i>Albizia amara</i> subsp. <i>sericocephala</i>					+		E/S-Z
224 <i>Albizia anthelmintica</i>			+	+			E/S-Z
225 <i>Albizia aylmeri</i>			+	+			E/S
226 <i>Albizia malacophylla</i> var. <i>ugandensis</i>			+	+	+		S
227 <i>Albizia zygia</i>		+	+				G-C + S
228 <i>Albizia</i> sp.				+			—
229 <i>Dichrostachys cinerea</i> subsp. <i>africana</i> var. <i>africana</i>			+	+	+		S-Z
230 <i>Dichrostachys cinerea</i> subsp. <i>africana</i> var. <i>karamojensis</i>			+				A
231 <i>Entada abyssinica</i>				+			S-Z
232 <i>Entada africana</i>			+	+	+		S
233 <i>Entada abyssinica</i> × <i>E. africana</i>		+	+				—
234 <i>Mimosa pigra</i>					+		Pantrop.
235 <i>Pithecellobium dulce</i>					+		Cult./Neotrop.
236 <i>Prosopis africana</i>					+		S
Papilionoideae							
237 <i>Aeschynomene indica</i>				+	+		Palaeotrop.
238 <i>Aeschynomene schimperi</i>			+	+			S-Z + M
239 <i>Aeschynomene uniflora</i>			+		+		S-Z + M
240 <i>Alysicarpus glumaceus</i> subsp. <i>glumaceus</i> var. <i>glumaceus</i>				+			S-Z
241 <i>Alysicarpus rugosus</i>				+			S-Z + M
242 <i>Argyrolobium arabicum</i>	+	+	+			+	Sa.mont. + Eth.mont.
243 <i>Astragalus atropilosulus</i> subsp. <i>abyssinicus</i> var. <i>abyssinicus</i>	+		+				Eth.mont.
244 <i>Biserrula pelecinus</i> subsp. <i>leiocarpa</i>	+		+				Afr.mont.
245 <i>Cicer arietinum</i>					+		Cult./Med.
246 <i>Crotalaria atrorubens</i>				+	+		S
247 <i>Crotalaria barkae</i>			+	+			S-Z
248 <i>Crotalaria brevidens</i> var. <i>intermedia</i>			+				E/S + A + Jos extension
249 <i>Crotalaria comosa</i>			+	+			S + Z
250 <i>Crotalaria goreënsis</i>			+	+			S-Z
251 <i>Crotalaria hyssopifolia</i>				+			S-Z
252 <i>Crotalaria laburnifolia</i> subsp. <i>laburnifolia</i>			+	+	+		Palaeotrop.
253 <i>Crotalaria lachnosema</i>			+				W/S
254 <i>Crotalaria naragutensis</i>			+	+			W/S
255 <i>Crotalaria ochroleuca</i>			+		+		S-Z
256 <i>Crotalaria pallida</i> var. <i>pallida</i>			+	+			Cult. Pantrop.
257 <i>Crotalaria podocarpa</i>					+		S-Z
258 <i>Crotalaria recta</i>			+				S-Z
259 <i>Crotalaria spinosa</i>			+				A + Z + SA
260 <i>Crotalaria steudneri</i>				+	+		A + Z
261 <i>Dalbergia melanoxylon</i>			+	+	+		S-Z + D
262 <i>Desmodium gangeticum</i>				+			Palaeotrop.
263 <i>Desmodium repandum</i>	+		+				Palaeotrop.
264 <i>Desmodium salicifolium</i>			+	+			S-Z + M
265 <i>Dolichos trilobus</i> subsp. <i>trilobus</i> var. <i>trilobus</i>					+		Palaeotrop.
266 <i>Eriosema nutans</i>	+						A + Z
267 <i>Eriosema psoraleoides</i>				+			S-Z + M
268 <i>Erythrina sigmoidea</i>			+	+	+		W/S
269 <i>Flemingia grahamiana</i>			+				S-Z + D
270 <i>Glycine wightii</i> subsp. <i>wightii</i> var. <i>longicauda</i>			+				S-Z
271 <i>Indigofera arrecta</i>	+		+			+	S-Z + M
272 <i>Indigofera costata</i> subsp. <i>costata</i>			+	+	+		W/S
273 <i>Indigofera hochstetteri</i>				+		+	S + A + SA + D
274 <i>Indigofera longicalyx</i>			+	+			Afr.mont.
275 <i>Indigofera parviflora</i>			+				Palaeotrop.
276 <i>Indigofera pulchra</i>			+				S-Z
277 <i>Indigofera spicata</i>	+		+		+		Palaeotrop. (weed)

	Location						Floristic Category
	1	2	3	4	5	6	
278 <i>Indigofera stenophylla</i> var. <i>stenophylla</i>			+			+	S + A
279 <i>Indigofera tinctoria</i>					+		Cult./Palaeotrop.
280 <i>Indigofera vicioides</i>			+	+			A + Z
281 <i>Lablab purpureus</i> subsp. <i>uncinatus</i>			+	+			S-Z
282 <i>Lathyrus sativus</i>					+		Cult./Cos.
283 <i>Lonchocarpus laxiflorus</i>			+	+			S + A
284 <i>Lotononis platycarpus</i>	+		+				Sa-Si + A + Z + Karoo
285 <i>Lotus arabicus</i>					+	+	Sa-Si + S-Z
286 <i>Lotus corniculatus</i> var. <i>eremanthus</i>	+						A + Afr.mont.
287 <i>Mundulea sericea</i>			+		+		Palaeotrop.
288 <i>Pterocarpus lucens</i>			+	+	+		S + A
289 <i>Rhynchosia malacophylla</i>			+				E/S + A
290 <i>Rhynchosia minima</i> var. <i>memnonia</i>			+			+	Sah. + A + SA
291 <i>Rhynchosia minima</i> var. <i>prostrata</i>			+	+			S-Z
292 <i>Rhynchosia resinosa</i>			+	+			S-Z
293 <i>Rhynchosia totta</i> var. <i>venulosa</i>			+			+	E/S-Z
294 <i>Sesbania sesban</i> subsp. <i>sesban</i> var. <i>nubica</i>			+	+		+	S-Z
295 <i>Stylosanthes fruticosa</i>			+	+			S-Z + M + D
296 <i>Tephrosia bracteolata</i>			+		+		S-Z
297 <i>Tephrosia purpurea</i> subsp. <i>leptostachya</i> var. <i>pubescens</i>				+		+	S-Z
298 <i>Vermiflux abyssinica</i>	+						Eth.mont.
299 <i>Vigna frutescens</i> subsp. <i>kotschy</i>			+				E/S + A
300 <i>Vigna macrorhyncha</i>			+				S-Z
301 <i>Vigna oblongifolia</i> var. <i>parviflora</i>				+			A + Z
302 <i>Vigna vexillata</i> var. <i>vexillata</i>				+	+		Pantrop.
303 <i>Zornia glochidiata</i>			+		+		S-Z + M
Salicaceae							
304 <i>Salix subserrata</i>			+	+			S-Z + Sa-Si extension
Ulmaceae							
305 <i>Celtis integrifolia</i>					+		S + A + SA
306 <i>Trema orientalis</i>		+					Palaeotrop. (forest pioneer)
Moraceae							
307 <i>Dorstenia walleri</i>				+	+		S + Z
308 <i>Ficus capensis</i>			+				S-Z
309 <i>Ficus glumosa</i> var. <i>glumosa</i>					+		S + A
310 <i>Ficus hochstetteri</i>			+				A + Z
311 <i>Ficus ingens</i> var. <i>tomentosa</i>		+	+	+			S-Z
312 <i>Ficus iteophylla</i>			+		+		S
313 <i>Ficus palmata</i>	+						Sa-Si + A
314 <i>Ficus platyphylla</i>			+				S + A
315 <i>Ficus salicifolia</i>			+	+	+	+	E/Sah. + A + SA
316 <i>Ficus sur</i>		+					A + SA
317 <i>Ficus sycomorus</i>			+	+	+	+	S-Z + Israel extension
318 <i>Ficus thonningii</i>			+				S-Z
319 <i>Morus acidosa</i>				+			Cult./Him.
Urticaceae							
320 <i>Girardinia heterophylla</i>			+				Palaeotrop.
321 <i>Parietaria debilis</i>	+	+				+	Palae. + Trop.mont.
322 <i>Pilea tetraphylla</i>			+	+			S-Z + M
Celastraceae							
323 <i>Maytenus buchannii</i>		+					S-Z
324 <i>Maytenus senegalensis</i>			+	+	+		Sa-Si + S-Z + Med.
Olacaceae							
325 <i>Ximenia americana</i>			+	+	+		S-Z
Loranthaceae							
326 <i>Tapinanthus globiferus</i>	+		+	+	+		S + A + SA
327 <i>Tapinanthus</i> sp.				+			—

	Location						Floristic Category
	1	2	3	4	5	6	
Rhamnaceae							
328 <i>Ziziphus abyssinica</i>			+	+	+		S-Z
329 <i>Ziziphus mauritiana</i>					+	+	Palaeotrop.
330 <i>Ziziphus spina-christi</i>			+	+	+		Sa-Si + Sah. + A
Ampelidaceae							
331 <i>Ampelocissus africana</i>				+	+		S-Z
332 <i>Cayratia gracilis</i>				+			S-Z
333 <i>Cissus cornifolia</i>			+				S-Z
334 <i>Cissus quadrangularis</i>			+		+		S-Z
335 <i>Cyphostemma adenocaulis</i>				+	+		S-Z
336 <i>Cyphostemma crinita</i>				+			S
337 <i>Cyphostemma crotalarioïdes</i>				+			S-Z
338 <i>Cyphostemma cymosa</i>			+	+	+		S
339 <i>Cyphostemma sesquipedalis</i>					+		E/S + A
340 <i>Rhoicissus revouilii</i>		+					S-Z
341 <i>Rhoicissus tridentata</i>		+					A + Z + Jos extension
Rutaceae							
342 <i>Teclea nobilis</i>		+					E/S-Z
Burseraceae							
343 <i>Boswellia papyrifera</i>			+		+		E/S + A
344 <i>Commiphora africana</i>			+	+	+		S-Z
345 <i>Commiphora pedunculata</i>					+		S + A
346 <i>Commiphora schimperi</i>			+	+			A + Z
Meliaceae							
347 <i>Khaya senegalensis</i>				+	+		S
348 <i>Pseudocedrela kotschy</i>					+		S
349 <i>Trichilia emetica</i> subsp. <i>emetica</i>			+				S-Z
350 <i>Trichilia emetica</i> subsp. <i>suberosa</i>			+				S
Sapindaceae							
351 <i>Cardiospermum halicacabum</i>			+		+		Pantrop.
352 <i>Paullinia pinnata</i>		+					S-Z + M + Neotrop.
Anacardiaceae							
353 <i>Anacardium occidentale</i>			+				Cult./Pantrop.
354 <i>Lannea fruticosa</i>			+	+	+		S + A
355 <i>Lannea humilis</i>					+		S-Z
356 <i>Lannea kerstingii</i>				+			S
357 <i>Lannea schimperi</i>			+	+			S-Z
358 <i>Ozoroa insignis</i>					+		S + A + SA
359 <i>Rhus vulgaris</i>	+	+	+	+		+	S-Z
360 <i>Sclerocarya birrea</i>			+		+		S-Z
Araliaceae							
361 <i>Cussonia arborea</i>		+	+	+	+		E/S-Z
362 <i>Polyscias fulva</i>		+					Afr.mont.
Umbelliferae							
363 <i>Anethum graveolens</i>	+		+			+	Cult./Med.
364 <i>Berula erecta</i>	+		+	+			Afr.mont. + Holo.
365 <i>Caucalis melanantha</i>	+						Afr.alp. + Afr.mont.
366 <i>Centella asiatica</i>			+	+			Palaeotrop.
367 <i>Coriandrum sativum</i>	+		+			+	Cult./Med.
368 <i>Diplophium africanum</i>	+		+	+			Afr.mont.
369 <i>Ferula communis</i>	+						Afr.mont. + Med.
370 <i>Foeniculum vulgare</i>	+		+	+	+		Cult./Med.
371 <i>Hydrocotyle ranunculoïdes</i>			+				Cos. - ?Neotrop. (aquatic)
372 <i>Steganotaenia araliacea</i>				+	+		S-Z
373 <i>Torilis arvensis</i>	+		+				Afr.mont. + Palae.
Ericaceae							
374 <i>Blaeria spicata</i> subsp. <i>spicata</i>	+						Eth.mont.

	Location						Floristic Category
	1	2	3	4	5	6	
Ebenaceae							
375 <i>Diospyros mespiliformis</i>		+		+	+		S-Z
Myrsinaceae							
376 <i>Embelia</i> sp.		+					—
377 <i>Maesa lanceolata</i>	+	+	+	+			S-Z
Loganiaceae							
378 <i>Strychnos innocua</i>			+	+			S-Z
379 <i>Strychnos spinosa</i>			+	+	+		S-Z + M
Oleaceae							
380 <i>Jasminum dichotomum</i>	+	+	+				S-Z
381 <i>Olea laperrinei</i>	+						Sa.mont.
Apocynaceae							
382 <i>Adenium obesum</i>			+				S + A + SA
383 <i>Carissa edulis</i>		+	+				Palaeotrop.
384 <i>Saba florida</i>		+					S-Z + M
Asclepiadaceae							
385 <i>Calotropis procera</i>			+	+	+		Sa-Si + S-Z (weed)
386 <i>Caralluma</i> sp. aff. <i>C. furta</i>					+		E/S
387 <i>Dregea abyssinica</i>		+					S-Z
388 <i>Dregea rubicunda</i>					+		E/S-Z
389 <i>Gomphocarpus fruticosus</i>	+		+				A + Z + M + Med.
390 <i>Leptadenia hastata</i>			+		+	+	S + A
391 <i>Pentarrhinum insipidum</i>			+	+			S-Z
392 <i>Pergularia daemia</i>					+		Sa-Si + S-Z + D
393 <i>Sarcostemma viminale</i>			+	+			S-Z + M
394 <i>Stathmostelma pedunculatum</i>					+		E/S-Z
Rubiaceae							
395 <i>Adina microcephala</i>		+					S-Z + M
396 <i>Anthospermum pachyrrhizum</i>	+						Eth.mont.
397 <i>Arbulocarpus sphaerostigma</i>			+	+	+		S-Z
398 <i>Borreria chaetocephala</i>					+		S-Z
399 <i>Fadogia cienkowski</i>			+				S-Z
400 <i>Feretia apodanthera</i>					+		S + A
401 <i>Galium spurium</i> var. <i>echinospermum</i>	+	+	+	+			Cos. (weed)
402 <i>Galium thunbergianum</i>	+						Afr.mont.
403 <i>Gardenia lutea</i>			+	+	+		S-Z
404 <i>Kohautia caespitosa</i>			+				A + Z + SA
405 <i>Kohautia coccinea</i>	+		+	+			S-Z
406 <i>Kohautia grandiflora</i>					+		S + A
407 <i>Kohautia senegalensis</i>					+		S + A + SA
408 <i>Mitracarpus scaber</i>					+		S-Z
409 <i>Mitragyna inermis</i>					+		G + S
410 <i>Mussaenda arcuata</i>			+				S-Z + G-C + M
411 <i>Oldenlandia corymbosa</i>					+		Pantrop. (weed)
412 <i>Oldenlandia echinulosa</i>			+				Afr.mont.
413 <i>Oldenlandia herbacea</i>				+	+		Palaeotrop. (weed)
414 <i>Pavetta hochstetteri</i> var. <i>glaberrima</i>			+		+		E/S + A
415 <i>Pentodon pentandrus</i>				+		+	S-Z + M
416 <i>Vangueria venosa</i>		+	+	+	+		S + A
417 <i>Vangueria</i> sp. aff. <i>V. linearisepala</i>					+		—
418 <i>Xeromphis nilotica</i>					+		S + A
Compositae							
419 <i>Acanthospermum hispidum</i>			+	+	+		Pantrop. (weed)
420 <i>Adenostemma cafferum</i>	+		+	+			S-Z
421 <i>Anisopappus africanus</i>			+				S-Z
422 <i>Aspilia ciliata</i>			+	+	+		S-Z
423 <i>Aspilia kotschy</i> var. <i>kotschy</i>			+		+		S-Z
424 <i>Bidens bipinnata</i>			+		+		Pantrop. (weed)
425 <i>Bidens biternata</i> var. <i>glabrata</i> forma abyssinica	+		+		+		Palaeotrop. (weed)

	Location						Floristic Category
	1	2	3	4	5	6	
426 <i>Bidens borianiana</i>				+	+		S + A
427 <i>Bidens chaetodonta</i>	+			+			Eth.mont.
428 <i>Bidens pilosa</i>	+		+	+	+	+	Pantrop. (weed)
429 <i>Bidens prestinaria</i>					+		Eth.mont.
430 <i>Bidens schimperi</i>			+		+		S-Z
431 <i>Blumea solidaginoïdes</i>			+	+			Palaeotrop.
432 <i>Centaurea senegalensis</i>	+		+		+	+	Sah.
433 <i>Chrysanthellum americanum</i>			+	+	+	+	Pantrop. (weed)
434 <i>Conyza aegyptiaca</i> var. <i>aegyptiaca</i>			+	+	+		S-Z
435 <i>Conyza hochstetteri</i>	+		+				A + Z
436 <i>Conyza pyrrhopappa</i> subsp. <i>pyrrhopappa</i>	+		+			+	Afr.mont. + S-Z
437 <i>Conyza schimperi</i> subsp. <i>schimperi</i>	+						Eth.mont.
438 <i>Conyza stricta</i> var. <i>stricta</i>			+				Palaeotrop.
439 <i>Conyza</i> sp. near <i>C. hochstetteri</i>					+		—
440 <i>Crassocephalum picridifolium</i>	+		+	+			S-Z
441 <i>Crepis rueppellii</i>	+		+				Afr.mont.
442 <i>Dichrocephala chrysanthemifolia</i>	+					+	Palaeotrop. (uplands)
443 <i>Dicoma tomentosa</i>				+			Sa-Si + S-Z
444 <i>Echinops boranensis</i>	+						Eth.mont.
445 <i>Echinops longifolius</i>			+	+			Afr.mont.
446 <i>Echinops macrochaetus</i>	+		+				Eth.mont.
447 <i>Eclipta prostrata</i>			+	+	+	+	Pantrop. (weed)
448 <i>Ethulia conyzoides</i>			+		+		Pantrop. (weed)
449 <i>Felicia dentata</i> subsp. <i>nubica</i>	+						End.
450 <i>Galinsoga parviflora</i>			+	+			Cos. (weed)
451 <i>Geigeria alata</i>					+	+	S-Z
452 <i>Gnaphalium luteo-album</i>	+			+		+	Cos. (weed)
453 <i>Gnaphalium marranum</i>	+						End.
454 <i>Gnaphalium undulatum</i>			+				Afr.mont. + M
455 <i>Gnaphalium schultzei</i>	+						Afr.mont.
456 <i>Gnaphalium</i> sp. ? <i>G. luteo-album</i> × <i>G. marranum</i>	+						—
457 <i>Guizotia scabra</i>	+		+	+	+		S-Z
458 <i>Gutenbergia rueppellii</i>					+		S + A
459 <i>Helichrysum glumaceum</i>	+		+		+		Sah. + A + SA
460 <i>Lactuca capensis</i>	+		+	+			Afr.mont. + M
461 <i>Laggera braunii</i>			+				Afr.mont.
462 <i>Laggera oloptera</i>					+		S
463 <i>Laggera pterodonta</i>			+	+			Palaeotrop. (weed)
464 <i>Launaea nana</i>				+			S-Z
465 <i>Melanthera pungens</i>			+	+	+		S + A
466 <i>Osteospermum vaillantii</i>	+						Afr.mont.
467 <i>Pegolettia senegalensis</i>			+			+	Sa-Si + S-Z
468 <i>Phagnalon scalarum</i> var. <i>scalarum</i>	+					+	Sa.mont. + Eth.mont. (Red Sea)
469 <i>Phagnalon scalarum</i> var. <i>meridionale</i>	+					+	Sa.mont.
470 <i>Pluchea dioscoridis</i>	+		+			+	Sa-Si + E/S-Z
471 <i>Pluchea nitens</i>					+		A + Z
472 <i>Pulicaria crispa</i>	+				+	+	Sa-Si + Sah. + A + SA
473 <i>Pulicaria scabra</i>	+						A + Z
474 <i>Pulicaria undulata</i>			+	+		+	Sa-Si + Sah. + SA
475 <i>Reichardia tingitana</i>	+		+		+		Sa-Si + E/Sah. + A + Med.
476 <i>Sclerocarpus africanus</i>			+	+	+		Sa-Si + S-Z
477 <i>Senecio abyssinicus</i>					+		S-Z
478 <i>Senecio hochstetteri</i>	+						Afr.mont.
479 <i>Senecio tuberosus</i>				+			A
480 <i>Senecio</i> sp. nov.	+						End.
481 <i>Sonchus asper</i>	+		+				Cos.
482 <i>Sonchus gigas</i>	+			+			Z + M
483 <i>Sphaeranthus angustifolius</i>					+		Sah.
484 <i>Sphaeranthus flexuosus</i>			+				Sah.
485 <i>Tithonia rotundifolia</i>					+		Cult./Neotrop.
486 <i>Tridax procumbens</i>			+				Pantrop. (weed)
487 <i>Vernonia adoënsis</i>			+	+	+		S-Z
488 <i>Vernonia amygdalina</i>	+		+	+		+	S-Z
489 <i>Vernonia galamensis</i>					+		S-Z
490 <i>Vernonia perrottetii</i>			+				S-Z
491 <i>Vernonia purpurea</i>				+			S-Z

	Location						Floristic Category
	1	2	3	4	5	6	
492 <i>Vernonia richardiana</i>	+		+	+			Afr.mont.
493 <i>Vernonia</i> ?sp. nov.					+		End.
494 <i>Vicoa leptoclada</i>				+			S-Z
Gentianaceae							
495 <i>Canscora diffusa</i>		+					Palaeotrop.
496 <i>Swertia abyssinica</i>	+						Afr.mont.
497 <i>Swertia</i> sp.	+						—
Primulaceae							
498 <i>Asterolinon adoënsis</i>	+		+				Afr.mont.
Plumbaginaceae							
499 <i>Plumbago zeylanica</i>			+	+	+	+	Palaeotrop.
Campanulaceae							
500 <i>Campanula edulis</i>	+						Afr.mont.
500A <i>Wahlenbergia erecta</i>					+		Palaeotrop.
500B <i>Wahlenbergia hirsuta</i>			+				Palaeotrop.
Lobeliaceae							
501 <i>Lobelia senegalensis</i>	+						S-Z
Boraginaceae							
502 <i>Arnebia hispidissima</i>	+		+	+		+	Sa-Si + Sah. + SA
503 <i>Cordia abyssinica</i>			+	+	+		S-Z
504 <i>Cynoglossum lanceolatum</i> subsp. lanceolatum	+	+	+				Palaeotrop.
505 <i>Heliotropium bacciferum</i>					+		Sa-Si + Sah. + SA
506 <i>Heliotropium ovalifolium</i>					+		Palaeotrop.
507 <i>Heliotropium strigosum</i>					+	+	Palaeotrop.
508 <i>Heliotropium supinum</i>					+		S-Z + Med.
509 <i>Myosotis abyssinica</i>	+						Afr.alp. + Afr.mont.
510 <i>Trichodesma africanum</i>			+	+	+	+	Sa-Si + S-Z
Solanaceae							
511 <i>Datura innoxia</i>					+		Pantrop. (weed)
512 <i>Datura stramonium</i>			+	+	+	+	Cos.
513 <i>Physalis angulata</i>					+		Pantrop. (weed)
514 <i>Physalis micrantha</i>					+		Pantrop. (weed)
515 <i>Physalis peruviana</i>			+				Pantrop. (weed)
516 <i>Solanum cerasiferum</i> subsp. cerasiferum					+		S + A
517 <i>Solanum incanum</i>			+	+	+		Sa-Si + S-Z
518 <i>Solanum indicum</i> subsp. distichum			+				S-Z + G-C
519 <i>Solanum nigrum</i>	+		+	+		+	Cos. (weed)
520 <i>Withania somnifera</i>	+		+	+		+	Sa-Si + S-Z
Convolvulaceae							
521 <i>Astripomoea lachnosperma</i>			+		+	+	S-Z
522 <i>Astripomoea malvacea</i> var. volkensii				+	+		S-Z
523 <i>Cuscuta planiflora</i> var. planiflora	+		+			+	Palaeotrop. + Med.
524 <i>Evolvulus alsinoides</i>			+		+		Pantrop. (weed)
525 <i>Ipomoea aquatica</i>					+		Pantrop. (weed)
526 <i>Ipomoea arachnosperma</i>				+			Sa-Si + S-Z
527 <i>Ipomoea asarifolia</i>					+		Pantrop.
528 <i>Ipomoea eriocarpa</i>				+		+	Palaeotrop.
529 <i>Ipomoea involucreta</i> var. involucreta					+		S-Z
530 <i>Ipomoea nil</i>			+		+		Pantrop. (weed)
531 <i>Ipomoea obscura</i> var. obscura				+			Palaeotrop.
532 <i>Ipomoea ochracea</i> var. ochracea			+	+			S-Z
533 <i>Ipomoea sinensis</i> subsp. belparosepala					+	+	S-Z
534 <i>Ipomoea vagans</i>					+		S
535 <i>Ipomoea verbascoidea</i>	+		+	+			S + Z
536 <i>Ipomoea verticillata</i>					+		S + A
537 <i>Merremia pterygocaulos</i>			+	+			S-Z + M
538 <i>Merremia tridentata</i> subsp. angustifolia	+		+		+		Palaeotrop.

		Location						Floristic Category
		1	2	3	4	5	6	
Scrophulariaceae								
539	Alectra sessiliflora var. senegalensis	+		+	+			Afr.mont. + M
540	Bellardia trixago	+		+				Afr.mont. + Med.
541	Buchnera hispida	+		+	+	+		S-Z + M + D
542	Celsia sudanica			+	+			End.
543	Craterostigma plantagineum		+	+	+	+		A + Z + SA
544	Cycnium camporum			+				S + A
545	Kickxia aegyptiaca subsp. virgata	+		+	+			End.
546	Kickxia dibolophylla	+		+				End.
547	Lindernia numulariifolia		+			+		Palaeotrop.
548	Lindernia oliverana			+				S-Z
549	Mimulus gracilis			+				Palaeotrop.
550	Misopates orontium	+		+			+	Palae.
551	Parentucellia latifolia	+						Med. + I-T + Cent.Eur.
552	Rhamphicarpa fistulosa				+			S-Z + M
553	Scoparia dulcis				+	+		Pantrop.
554	Scrophularia arguta	+						Med. + A + SA
555	Sopubia ramosa	+		+	+			S-Z
556	Striga asiatica			+		+		Palaeotrop.
557	Striga hermonthica			+		+		S-Z + M
558	Striga macrantha			+	+			S
559	Striga passargei					+		S
560	Verbascum sinaiticum	+		+				Afr.mont. + E/Med. + I
561	Veronica anagalis-aquatica	+		+	+		+	Cos.
Orobanchaceae								
562	Orobanche ramosa	+		+		+		Cos. (weed)
Lentibulariaceae								
563	Utricularia gibba subsp. exoleta			+			+	Palaeotrop.
564	Utricularia stellaris					+		Palaeotrop.
^{WO}Bigoniaceae								
565	Kigelia africana					+		S-Z + G-C
566	Stereospermum kunthianum			+	+	+		S-Z
Pedaliaceae								
567	Ceratotheca sesamoides					+		S-Z
568	Sesamum angustifolium					+		S-Z
569	Sesamum indicum					+		Cult./Pantrop.
Acanthaceae								
570	Asystasia gangetica				+	+		Palaeotrop.
571	Blepharis linariifolia					+		S-Z
572	Blepharis maderaspatensis subsp. rubiifolia				+			S-Z
573	Dyschoriste perrottetii				+			S-Z
574	Dyschoriste radicans			+	+			A + Z
575	Hygrophila abyssinica				+			S-Z
576	Hygrophila auriculata			+		+		Palaeotrop.
577	Hypoestes forskalei	+		+	+		+	S-Z
578	Justicia kotschy			+	+	+		E/S + A
579	Lepidagathis collina	+		+	+			S-Z
580	Lepidagathis scariosa				+	+		S-Z + D
581	Monechma ciliatum			+		+	+	S-Z
582	Nelsonia canescens			+	+	+		Pantrop.
583	Peristrophe bicalyculata			+		+	+	S-Z + D
584	Ruellia patula			+			+	S-Z + M + D
585	Ruspolia decurrens			+				S-Z
Verbenaceae								
586	Clerodendrum umbellatum			+	+	+		S-Z
587	Lantana camara					+		Cult./Pantrop.
588	Lantana rhodensis		+		+			S-Z
589	Lippia multiflora			+	+			S + G-C
590	Verbena officinalis			+	+			Cos. (weed)
591	Vitex doniana			+				S-Z + G-C

		Location						Floristic Category
		1	2	3	4	5	6	
Labiatae								
592	<i>Basilicum polystachyon</i>					+		Palaeotrop.
593	<i>Becium obovatum</i>					+		S-Z
594	<i>Haumaniastrum caeruleum</i>			+	+			S-Z
595	<i>Haumaniastrum galeopsifolium</i>			+				S-Z
596	<i>Hoslundia opposita</i>		+		+	+		S-Z + M
597	<i>Hyptis pectinata</i>			+	+			Pantrop.
598	<i>Lavandula pubescens</i>	+						E/Med.
599	<i>Leonotis nepetifolia</i> var. <i>africana</i>				+			S-Z
600	<i>Leucas martinicensis</i>			+	+	+		Pantrop.
601	<i>Mentha longifolia</i>	+		+	+	+	+	Palae. + A
602	<i>Nepeta ballotifolia</i>	+						Eth.mont.
603	<i>Ocimum hadiense</i>			+		+		S + A + SA
604	<i>Ocimum suave</i>			+				Palaeotrop.
605	<i>Otostegia fruticosa</i> subsp. <i>fruticosa</i>	+		+	+			Afr.mont.
606	<i>Plectranthus caninus</i>			+		+		A + Z + D
607	<i>Plectranthus jebel-marrae</i>		+		+	+		End.
608	<i>Saturja punctata</i>	+			+		+	Afr.alp. + Afr.mont.
609	<i>Solenostemon latifolius</i>	+		+	+			S-Z
610	<i>Solenostemon monostachyus</i> subsp. <i>perennis</i>				+			S
Hydrocharitaceae								
611	<i>Ottelia ulvifolia</i>			+	+			S-Z + M
Alismataceae								
612	<i>Limnophyton obtusifolium</i>					+		Palaeotrop.
Potamogetonaceae								
613	<i>Potamogeton nodosus</i>	+		+	+			Cos.
614	<i>Potamogeton pusillus</i>	+		+	+			Cos.
615	<i>Potamogeton schweinfurthii</i>			+	+			S-Z
Najadaceae								
616	<i>Najas graminea</i>					+		Palaeotrop.
Commelinaceae								
617	<i>Ancilema lanceolatum</i> subsp. <i>lanceolatum</i>			+				S + A
618	<i>Commelina beghalensis</i> var. <i>benghalensis</i>					+		Palaeotrop. (weed)
619	<i>Commelina bracteosa</i>			+		+		S-Z
620	<i>Commelina diffusa</i> subsp. <i>diffusa</i>					+	+	Pantrop.
621	<i>Commelina imberbis</i>			+		+		S-Z
622	<i>Commelina kotschyi</i>			+	+			E/Sah.
623	<i>Commelina subulata</i>		+		+			S-Z + D
624	<i>Cyanotis barbata</i>	+						Afr.mont. + Him.
625	<i>Cyanotis foecunda</i>			+	+	+		S-Z
626	<i>Cyanotis lanata</i>				+			S-Z
627	<i>Murdannia simplex</i>				+			Palaeotrop.
Zingiberaceae								
628	<i>Kaempferia rosea</i>					+		E/S-Z
Liliaceae								
629	<i>Albuca sudanica</i>			+	+	+		W/S
630	<i>Aloë elegans</i>	+						Eth.mont.
631	<i>Asparagus africanus</i>		+	+		+		S-Z
632	<i>Asparagus flagellaris</i>			+		+		S-Z
633	<i>Chlorophytum affine</i> var. <i>curviscapum</i>					+		E/S-Z
634	<i>Chlorophytum blepharophyllum</i>					+		S-Z
635	<i>Chlorophytum gallabatense</i>					+		S-Z
636	<i>Chlorophytum geophilum</i>					+		S + Z
637	<i>Chlorophytum schweinfurthii</i>			+	+			E/S
638	<i>Chlorophytum tuberosum</i>			+		+		S-Z
639	<i>Dipcadi viride</i>			+	+	+		A + Z
640	<i>Drimiopsis barteri</i>					+		S
641	<i>Gloriosa superba</i>				+	+		Palaeotrop.
642	<i>Iphigenia ledermannii</i>					+		W/S

	Location						Floristic Category
	1	2	3	4	5	6	
643 <i>Scilla maesta</i>				+	+		E/S-Z
644 <i>Urginea altissima</i>			+	+	+		S-Z
645 <i>Urginea indica</i>				+			Palaeotrop.
Pontederiaceae							
646 <i>Heteranthera callifolia</i>					+		S-Z
Araceae							
647 <i>Amorphophallus abyssinicus</i>			+	+	+		S-Z
648 <i>Pistia stratiotes</i>					+		Pantrop.
649 <i>Stylochiton borumensis</i>					+		E/S-Z
Lemnaceae							
650 <i>Lemna minor</i>				+			Cos. (aquatic)
651 <i>Lemna perpusilla</i>	+		+	+	+		Cos. (aquatic)
Typhaceae							
652 <i>Typha domingensis</i>			+	+		+	Pantrop.
Amaryllidaceae							
653 <i>Allium</i> sp.			+				Cult.
654 <i>Ammocharis tinneana</i>			+		+		E/S-Z
655 <i>Crinum ornatum</i>			+	+	+		S-Z
656 <i>Haemanthus multiflorus</i>		+	+	+	+		S-Z
Iridaceae							
657 <i>Gladiolus natalensis</i>				+	+		S-Z
658 <i>Gladiolus unguiculatus</i>					+		S-Z
659 <i>Lapeirousia schimperii</i>	+		+	+	+		A + Z
660 <i>Romulea camerooniana</i>	+						Afr.alp. + Afr.mont.
Dioscoreaceae							
661 <i>Dioscorea bulbifera</i>				+			Pantrop.
662 <i>Dioscorea quartiniana</i>					+		S-Z + M
Agavaceae							
663 <i>Sansevieria liberica</i>		+					W/S
Palmae							
664 <i>Borassus aethiopum</i>					+		S-Z
665 <i>Hyphaene thebaica</i>					+	+	S + A + SA
666 <i>Phoenix reclinata</i>		+	+	+			S-Z
Hypoxidaceae							
667 <i>Curculigo pilosa</i>					+		S-Z + M
668 <i>Hypoxis angustifolia</i>		+	+				S-Z + M
Taccaceae							
669 <i>Tacca leontopetaloides</i>			+		+		Palaeotrop.
Orchidaceae							
670 <i>Ansellia gigantea</i> var. <i>nilotica</i>		+	+	+			S-Z
671 <i>Disperis anthoceros</i> var. <i>anthoceros</i>		+					S-Z
672 <i>Habenaria armatissima</i>			+		+		S-Z
673 <i>Habenaria bongensium</i>	+						S
674 <i>Habenaria cirrhata</i>				+			S-Z + M
675 <i>Habenaria filicornis</i>	+			+			S-Z
676 <i>Habenaria humilior</i>	+			+			A + Z
677 <i>Habenaria</i> ?sp. nov.	+						End.
678 <i>Habenaria</i> sp.	+		+				—
679 <i>Holothrix tridentata</i>	+						Afr.mont.
680 <i>Nervilia kotschy</i>				+			S-Z
681 <i>Satyrium coriophoroides</i>	+						Afr.mont.

	Location						Floristic Category
	1	2	3	4	5	6	
Juncaceae							
682 <i>Juncus bufonius</i>	+					+	Cos.
683 <i>Juncus dregeanus</i> subsp. <i>bachitii</i>	+						Afr. mont.
684 <i>Juncus punctorius</i>	+		+			+	Med. + A + Z
Cyperaceae							
685 <i>Bulbostylis densa</i> var. <i>densa</i>	+					+	Palaeotrop.
686 <i>Carex</i> sp. near <i>C. echinochloë</i>			+				—
687 <i>Cyperus alopecurioides</i>				+			Pantrop.
688 <i>Cyperus cuspidatus</i>				+			Pantrop.
689 <i>Cyperus digitatus</i> subsp. <i>auricomus</i>					+		S-Z
690 <i>Cyperus esculentus</i>				+	+	+	Pantrop. (weed)
691 <i>Cyperus exaltatus</i>					+		Pantrop.
692 <i>Cyperus fenzelianus</i>				+		+	S + A + D + Med.
693 <i>Cyperus laevigatus</i>	+		+	+	+	+	Pantrop.
694 <i>Cyperus reduncus</i>					+		S + A
695 <i>Cyperus rigidifolius</i>	+						Afr. mont.
696 <i>Cyperus rotundus</i>					+	+	Pantrop. (weed)
697 <i>Cyperus schimperanus</i>	+		+				S + A
698 <i>Cyperus</i> sp. nov.	+						End.
699 <i>Eleocharis</i> sp. aff. <i>E. tibetica</i>	+					+	—
700 <i>Fimbristylis bisumbellata</i>				+	+		Palaeotrop.
701 <i>Fimbristylis complanata</i>	+		+				Pantrop.
702 <i>Fimbristylis dichotoma</i>			+			+	Pantrop.
703 <i>Fimbristylis hispidula</i>					+	+	S-Z + Neotrop.
704 <i>Fimbristylis</i> sp.			+				—
705 <i>Fuirena pubescens</i>	+		+			+	S-Z + Med.
706 <i>Kyllinga alba</i>					+		S-Z
707 <i>Kyllinga chlorotropis</i>	+						Eth. mont.
708 <i>Kyllinga erecta</i> var. <i>polyphylla</i>				+			S-Z + M
709 <i>Kyllinga erecta</i> var. <i>africana</i>				+			S
710 <i>Kyllinga odorata</i>			+				Pantrop.
711 <i>Kyllinga pumila</i>				+			Cos. (weed)
712 <i>Mariscus alternifolius</i>		+					S-Z + Med. + Neotrop.
713 <i>Mariscus psilostachys</i>					+		A + Z
714 <i>Mariscus squarrosus</i>				+	+		Pantrop.
715 <i>Pycnus capillifolius</i>				+			S-Z + M
716 <i>Pycnus elegantulus</i>	+						S-Z
717 <i>Pycnus flavescens</i>			+	+			Cos.
718 <i>Pycnus lanceolatus</i>				+			S-Z + M + Neotrop.
719 <i>Pycnus macrostachyos</i> var. <i>macrostachyos</i>					+		Pantrop.
720 <i>Pycnus macrostachyos</i> var. <i>tenuis</i>					+		S + Z
721 <i>Pycnus mundtii</i>			+	+		+	A + Z + M + Med.
722 <i>Pycnus pumilis</i>					+		Pantrop.
723 <i>Pycnus unioloides</i>				+			Pantrop.
724 <i>Pycnus</i> ?sp. nov. aff. <i>Pycnus subtrigonus</i>			+				End.
725 <i>Scirpus articulatus</i>					+		Palaeotrop.
726 <i>Scirpus brachyceras</i>	+						S-Z + M
727 <i>Scirpus microcephalus</i>				+	+		S-Z + D
Gramineae							
728 <i>Agrostis lachnantha</i>	+		+				Afr. mont.
729 <i>Aira caryophyllea</i>	+						Afr. alp. + Afr. mont. + Palae.
730 <i>Alloteropsis cimicina</i>				+	+		S-Z + M + D
731 <i>Andropogon distachyos</i>	+					+	Afr. mont. + Med.
732 <i>Andropogon fastigiatus</i>	+		+	+	+		Pantrop.
733 <i>Andropogon gayanus</i> var. <i>squamulatus</i>	+		+	+	+		S-Z
734 <i>Andropogon gayanus</i> var. <i>tridentatus</i>			+		+		S
735 <i>Andropogon longipes</i>	+						Afr. mont.
736 <i>Andropogon shirensis</i>			+			+	S-Z
737 <i>Anthephora hochstetteri</i>				+	+		Sah. + A
738 <i>Anthephora lynesii</i>			+	+	+		E/Sah.
739 <i>Anthephora</i> sp. aff. <i>A. nigritana</i>					+		—
740 <i>Aristida adoënsis</i>	+						A + Z
741 <i>Aristida adscensionis</i>			+	+	+	+	Pantrop.
742 <i>Aristida caeruleascens</i>	+					+	Sa-Si + Sah. + A + Med. + I-T
743 <i>Aristida congesta</i>	+						A + Z

	Location						Floristic Category
	1	2	3	4	5	6	
744 <i>Aristida cumingiana</i>	+						Palaeotrop.
745 <i>Aristida funiculata</i>				+		+	Sa-Si + Sah. + D
746 <i>Aristida hordeacea</i>				+	+		S-Z
747 <i>Arthraxon lancifolius</i>				+	+		Palaeotrop.
748 <i>Arthraxon quartinianus</i>			+		+		Pantrop.
749 <i>Arundinella pumila</i>			+	+			Palaeotrop.
750 <i>Beckeropsis nubica</i>	+				+		E/S + A
751 <i>Beckeropsis uniseta</i>	+		+	+			S-Z
752 <i>Bothriochloa insculpta</i>			+	+			S-Z + D
753 <i>Brachiaria brizantha</i>			+	+			S-Z
754 <i>Brachiaria deflexa</i>			+	+		+	Sa-Si + S-Z + M
755 <i>Brachiaria humidicola</i>			+	+			S + Z
756 <i>Brachiaria jubata</i>	+		+	+			S-Z
757 <i>Brachiaria kotschyana</i>				+			S-Z
758 <i>Brachiaria lata</i>					+		S + A + SA
759 <i>Brachiaria ramosa</i>					+		Palaeotrop.
760 <i>Brachiaria secernenda</i>				+			E/Sah. + A
761 <i>Brachiaria semiundulata</i>	+	+					A + Z + D
762 <i>Brachiaria serrifolia</i>				+	+		S-Z
763 <i>Brachiaria xantholeuca</i>				+	+		S-Z
764 <i>Brachypodium sylvaticum</i>	+						Palae.
765 <i>Bromus leptoclados</i>	+						Afr.mont.
766 <i>Bromus pectinatus</i>	+						Afr.mont. + Sa.mont.
767 <i>Calamagrostis epigejos</i> var. <i>capensis</i>	+						Afr.mont.
768 <i>Capillipedium parviflorum</i>	+						Palaeotrop.
769 <i>Cenchrus biflorus</i>				+	+	+	Sa-Si + S-Z
770 <i>Cenchrus ciliaris</i>			+		+	+	Sa-Si + S-Z
771 <i>Chloris gayana</i>	+		+	+	+		S-Z
772 <i>Chloris lamproparia</i>					+		Sah. + A
773 <i>Chloris pilosa</i>				+	+		S + A
774 <i>Chloris prieuri</i>					+		Sa-Si + Sah. + SA
775 <i>Chloris pycnotherix</i>	+		+	+			S-Z + Med.
776 <i>Chloris robusta</i>			+	+	+		S
777 <i>Chloris virgata</i>				+	+		Pantrop.
778 <i>Ctenium newtonii</i>	+		+	+	+		S-Z
779 <i>Ctenium somalense</i>	+			+			A + Z + M
780 <i>Cymbopogon afronardus</i>			+				A + Z
781 <i>Cymbopogon caesius</i>	+		+				A + SA + D
782 <i>Cymbopogon commutatus</i>			+		+		Sah.
783 <i>Cymbopogon excavatus</i>	+		+	+	+		E/S-Z
784 <i>Cymbopogon giganteus</i>	+		+	+	+		S-Z
785 <i>Cymbopogon nervatus</i>	+		+				Palaeotrop.
786 <i>Cymbopogon schoenanthus</i> subsp. <i>proximus</i>	+				+	+	Sah. + A
787 <i>Cymbopogon sennarensis</i>					+		E/Sah.
788 <i>Cynodon dactylon</i>				+	+	+	Pantrop.
789 <i>Dactyloctenium aegyptium</i>				+	+	+	Palaeotrop.
790 <i>Desmostachya bipinnata</i>					+	+	Sa-Si + Sah. + A
791 <i>Dichanthium papillosum</i>			+				A + Z
792 <i>Digitaria abyssinica</i>				+			S-Z + M + D
793 <i>Digitaria ciliaris</i>	+		+	+	+		Palaeotrop.
794 <i>Digitaria diagonalis</i> var. <i>hirsuta</i>	+		+				S-Z
795 <i>Digitaria gayana</i>					+		S-Z
796 <i>Digitaria gazensis</i>				+			A + Z
797 <i>Digitaria horizontalis</i>					+		S-Z
798 <i>Digitaria longiflora</i>					+		Palaeotrop.
799 <i>Digitaria ternata</i>	+			+			Palaeotrop.
800 <i>Digitaria velutina</i>				+			S-Z
801 <i>Diheteropogon amplexens</i> var. <i>amplexens</i>			+	+			A + Z
802 <i>Diheteropogon amplexens</i> var. <i>catangensis</i>				+			S-Z
803 <i>Echinochloa colona</i>				+	+	+	Pantrop.
804 <i>Echinochloa crusgalli</i>					+		Pantrop.
805 <i>Echinochloa frumentacea</i>				+	+		A + Z
806 <i>Echinochloa pyramidalis</i>			+	+			S-Z
807 <i>Eleusine indica</i> subsp. <i>africana</i>				+	+		S-Z

	Location						Floristic Category
	1	2	3	4	5	6	
808 <i>Elionurus hirtifolius</i>			+	+			Sah.
809 <i>Enteropogon macrostachyus</i>			+	+			S-Z
810 <i>Eragrostis arenicola</i>			+	+			S-Z
811 <i>Eragrostis aspera</i>			+	+	+		S-Z + D (weed)
812 <i>Eragrostis atrovirens</i> var. <i>atrovirens</i>	+		+	+			Palaeotrop.
813 <i>Eragrostis cilianensis</i>	+		+	+	+	+	Palaeotrop.
814 <i>Eragrostis ciliaris</i>					+	+	Pantrop.
815 <i>Eragrostis cylindriflora</i> var. <i>gymnorrhachis</i>			+		+		S-Z
816 <i>Eragrostis gangetica</i>			+	+		+	S-Z + D (weed)
817 <i>Eragrostis namaquensis</i> var. <i>namaquensis</i>			+	+	+	+	S-Z
818 <i>Eragrostis namaquensis</i> var. <i>diplanchnoïdes</i>					+		Palaeotrop.
819 <i>Eragrostis pilosa</i>	+		+	+	+	+	Palaeotrop.
820 <i>Eragrostis tenella</i>				+	+		Palaeotrop.
821 <i>Eragrostis tremula</i>				+	+		Palaeotrop.
822 <i>Eragrostis turgida</i>				+			S
823 <i>Eriochloa fatmensis</i>				+	+		S-Z
824 <i>Euclasta condylotricha</i>				+	+		S-Z + Neotrop.
825 <i>Festuca abyssinica</i> var. <i>abyssinica</i>	+					+	Afr.alp. + Afr.mont.
826 <i>Gastridium phleoïdes</i>	+					+	Afr.mont. + Med.
827 <i>Hackelochloa granularis</i>			+	+	+		Pantrop.
828 <i>Harpachne schimperi</i>	+						A + Z
829 <i>Helictotrichon elongatum</i>	+					+	Afr.mont. + M
830 <i>Hemarthria natans</i>				+			A + Z + M
831 <i>Heteropogon contortus</i>			+	+	+	+	Pantrop.
832 <i>Heteropogon melanocarpus</i>			+	+	+		Pantrop.
833 <i>Hyparrhenia anamesa</i>	+						A + Z
834 <i>Hyparrhenia anthistirioides</i>	+		+	+	+		E/S-Z
835 <i>Hyparrhenia collina</i>			+	+			S-Z
836 <i>Hyparrhenia confinis</i> var. <i>nudiglumis</i>					+		E/S
837 <i>Hyparrhenia cymbaria</i>			+				E/S-Z + M
838 <i>Hyparrhenia dichroa</i>			+	+			A + Z
839 <i>Hyparrhenia dregeana</i>	+		+				A + Z
840 <i>Hyparrhenia filipendula</i> var. <i>filipendula</i>				+			S-Z
841 <i>Hyparrhenia filipendula</i> var. <i>pilosa</i>			+	+			Palaeotrop.
842 <i>Hyparrhenia griffithii</i>			+				Z + M + D
843 <i>Hyparrhenia hirta</i>	+		+	+		+	Sa-Si + S-Z + Med. + I-T
844 <i>Hyparrhenia multiplex</i>	+						Eth.mont.
845 <i>Hyparrhenia nyassae</i>	+		+	+			Palaeotrop.
846 <i>Hyparrhenia pilgeriana</i>	+						A + Z
847 <i>Hyparrhenia poecilotrichna</i>			+	+			S-Z
848 <i>Hyparrhenia rudis</i>			+	+			S-Z + M
849 <i>Hyparrhenia rufa</i>			+	+	+		S-Z + M + Neotrop.
850 <i>Hyparrhenia schimperi</i>			+				A + Z + M
851 <i>Hyparrhenia subplumosa</i>	+						S + Z
852 <i>Hyparrhenia tamba</i>	+		+				A + Z
853 <i>Hyparrhenia variabilis</i>			+				A + Z + M
854 <i>Imperata cylindrica</i> var. <i>africana</i>			+		+		S-Z + M
855 <i>Leersia hexandra</i>				+			Pantrop.
856 <i>Lophochloa phleoïdes</i>	+						Sa-Si + Med. + I-T
857 <i>Loudetia annua</i>				+			S + A
858 <i>Loudetia simplex</i>	+						S-Z + M
859 <i>Loudetia togoënsis</i>					+		S
860 <i>Melinis ambigua</i>	+		+			+	A + Z
861 <i>Melinis tenuinervis</i>			+				A + Z
862 <i>Microchloa indica</i>					+		Pantrop.
863 <i>Microchloa kunthii</i>	+	+	+	+	+		Pantrop.
864 <i>Oplismenus hirtellus</i>		+	+				Pantrop.
865 <i>Oryza longistaminata</i>					+		S-Z + M
866 <i>Oxytenanthera abyssinica</i>			+		+		S-Z
867 <i>Panicum callosum</i>			+	+			E/S + A
868 <i>Panicum dregeanum</i>			+				S-Z
869 <i>Panicum fluvicola</i>				+			S-Z
870 <i>Panicum infestum</i>				+			A + Z
871 <i>Panicum laetum</i>				+	+		Sah. + A

	Location						Floristic Category
	1	2	3	4	5	6	
872 <i>Panicum maximum</i>					+		S-Z
873 <i>Panicum porphyrrhizos</i>				+			S-Z
874 <i>Panicum pusillum</i>	+						Afr.mont.
875 <i>Panicum subalbidum</i>				+	+		S-Z + M
876 <i>Paspalum scrobiculatum</i>			+	+	+		Palaeotrop.
877 <i>Pennisetum fallax</i>					+		Sah. + A
878 <i>Pennisetum giganteum</i>	+		+	+			S + A
879 <i>Pennisetum glabrum</i>	+						Afr.mont.
880 <i>Pennisetum gracilescens</i>	+						Eth.mont.
881 <i>Pennisetum pedicellatum</i>			+	+	+		Sa-Si + S + A + D
882 <i>Pennisetum polystachion</i>			+	+			Palaeotrop.
883 <i>Pennisetum ramosum</i>			+	+	+		S-Z
884 <i>Pennisetum stenorrhachis</i>			+				A
885 <i>Pennisetum violaceum</i>			+		+	+	Sah.
886 <i>Pentaschistis pictigluma</i>	+						Afr.alp. + Afr.mont.
887 <i>Phaenanthoecium köstlini</i>	+						Eth.mont.
888 <i>Phragmites karka</i>				+	+		Palaeotrop.
889 <i>Poa bulbosa</i> var. <i>vivipara</i>	+						Palae.
890 <i>Poa leptoclada</i>	+						Afr.alp. + Afr.mont.
891 <i>Pogonarthria squarrosa</i>			+	+	+		S-Z
892 <i>Polypogon monspeliensis</i>	+		+	+		+	Cos.
893 <i>Rhynchelytrum grandiflorum</i>				+	+		A + Z
894 <i>Rhynchelytrum longisetum</i>		+					Eth.mont.
895 <i>Rhynchelytrum minutiflorum</i> var. <i>melinioides</i>			+				Z
896 <i>Rhynchelytrum repens</i>	+		+	+	+		S-Z
897 <i>Rhynchelytrum villosum</i>			+	+			Sa-Si + S-Z + M + D
898 <i>Rottboellia exaltata</i>			+	+	+		Pantrop.
899 <i>Saccharum spontaneum</i> subsp. <i>aegyptiacum</i>	+			+	+	+	S-Z + E/Med.
900 <i>Schizachyrium brevifolium</i>				+			Pantrop.
901 <i>Schizachyrium exile</i>				+	+		Palaeotrop.
902 <i>Schoenefeldia gracilis</i>					+	+	Sa-Si + Sah.
903 <i>Sehima ischaemoïdes</i>					+		S-Z + D
904 <i>Setaria anceps</i> var. <i>anceps</i>			+				S-Z
905 <i>Setaria barbata</i>			+	+			Palaeotrop.
906 <i>Setaria incrassata</i>					+		E/S-Z
907 <i>Setaria lynesii</i>					+		E/Sah.
908 <i>Setaria pallide-fusca</i>			+	+	+		Palaeotrop.
909 <i>Setaria plicatilis</i>		+	+	+			A + Z
910 <i>Setaria sphacelata</i>			+		+		S-Z
911 <i>Setaria verticillata</i>				+	+	+	Cos.
912 <i>Snowdenia polystachya</i>	+						Eth.mont.
913 <i>Sorghum aethiopicum</i>			+				S + A
914 <i>Sorghum sudanense</i>			+	+			E/Sah.
915 <i>Sorghum usambarense</i>			+				Z
916 <i>Sorghum verticilliflorum</i>			+				A + Z
917 <i>Sporobolus angustifolius</i>			+				A + Z
918 <i>Sporobolus festivus</i>			+	+	+		S-Z
919 <i>Sporobolus ioclados</i>				+	+		Sa-Si + S-Z
920 <i>Sporobolus microprotus</i>				+	+		S + A
921 <i>Sporobolus panicoides</i>			+	+	+		A + Z
922 <i>Sporobolus paniculatus</i>				+			S-Z + M
923 <i>Sporobolus pellucidus</i>					+		S-Z
924 <i>Sporobolus pyramidalis</i>				+	+		S-Z + M
925 <i>Sporobolus stapfianus</i>			+	+			S-Z + M
926 <i>Tetrapogon cenchrifomis</i>					+		Sah. + A + SA
927 <i>Themeda triandra</i>	+		+				Palaeotrop.
928 <i>Tripogon leptophyllus</i>	+		+	+			Eth.mont.
929 <i>Tripogon minimus</i>				+	+	+	S-Z + M
930 <i>Tripogon montanus</i>	+						Eth.mont.
931 <i>Urochloa trichopus</i>				+	+		S-Z
932 <i>Vulpia bromoides</i>	+						Afr.alp. + Afr.mont. + Palae.

Appendix D

A detailed phytogeographical analysis of the flora

Key to Floristic Categories

Cos.	Cosmopolitan	Eth.mont.	Ethiopian montane Sub-Region
Hol.	Holarctic	Sa.mont.	Saharo montane Domain
Palae.	Palaeartic	Karoo	Karoo-Namid Region
Pantrop.	Pantropical	Sa-Si	Saharo-Sindian Region
Palaeotrop.	Palaeotropical	Sa	Sahara Sub-Region
Neotrop.	Neotropical	Si	Sindian Sub-Region
S-Z	Sudano-Zambezian	D	Deccan Region
Sah.	Sahelian Domain	M	Madagascan Region
S	Sudanian Domain	Med.	Mediterranean Region
A	Aforiental Domain	Cent.Eur.	Central European Region
Z	Zambezian Domain	I-T	Irano-Turanian Region
SA	South Arabian Domain	I	Iranian Sub-Region
G-C	Guineo-Congo Region	prefix E/	eastern
G	Guinea Domain	prefix W/	western
C	Congo Domain	Cult.	Cultigen
Afr.alp.	Afro-alpine Region	Him.	Himalayan Region
Afr.mont.	Afro-montane Region		

Floristic Category	Total Flora			Jebel Marra										Lowland Plain							
				Massif+ Piedmont			Upland Grassland			Gallery Forest		Hill Savanna					Piedmont Plain				
	%			%			%			%		%		%							
Cos.	28	3.1		27	3.7		13	6.0		1	2.1		21	4.7		19	4.9		8	1.8	
Palae.	8	0.9		8	1.1		7	3.2		—	—		20	4.4		4	0.9		1	0.2	
Pantrop.	88	9.8		59	8.1		7	3.2		3	6.1		43	9.9		41	10.5		67	15.3	
Palaeotrop.	98	10.9		75	10.3		17	7.8		5	10.4		43	9.9		39	10.0		59	13.5	
S-Z	203	285	31.8	172	236	32.5	29	36	16.5	16	24	50.0	122	159	35.6	117	161	41.3	107	152	34.8
E/S-Z	17			9			2			2			7			5			14		
E/S-Z + M	1			1			—			—			1			—			—		
S-Z + M	37			32			4			3			16			22			14		
S-Z + M + D	6			5			1			—			3			4			3		
S-Z + D	15			12			—			1			9			10			11		
S-Z + M + Neotrop.	3			3			—			1			1			2			1		
S-Z + Neotrop.	2			1			—			—			—			1			2		
S-Z + Med. + Neotrop.	1			1			—			1			—			—			—		
Sah.	9	36	4.0	7	24	3.3	1	3	1.4	—	—	—	6	17	3.8	3	15	3.8	6	28	6.4
E/Sah.	5			3			—			—			3			3			3		
E/Sah. + A	1			1			—			—			—			1			—		
E/Sah. + A + SA	3			2			—			—			2			2			3		
Sah. + A	10			6			1			—			2			4			10		
Sah. + A + SA	4			2			1			—			2			—			3		
Sah. + A + M	1			1			—			—			—			1			—		
Sah. + S + A	1			1			—			—			1			1			1		
Sah. + S + SA	2			1			—			—			1			—			2		
S	31	106	11.8	19	68	9.4	1	6	2.8	—	2	4.2	9	48	10.8	14	42	10.8	23	70	16.0
W/S	8			7			—			1			6			4			5		
E/S	4			2			—			—			1			2			2		
E/S + A	10			8			1			—			7			3			7		
E/S + A + Jos extension	1			1			—			—			1			—			—		
S + A	33			20			1			1			17			12			22		

Floristic Category	Total Flora			Jebel Marra												Lowland Plain					
				Massif + Piedmont			Upland Grassland			Gallery Forest			Hill Savanna						Piedmont Plain		
	%			%			%			%			%			%					
S + A + SA	8			3			1			—			3			1			6		
S + A + SA + Neotrop.	1			—			—			—			—			—			1		
S + A + SA + D	1			1			—			—			—			1			—		
S + Z	8			6			2			—			3			5			3		
S + Z + D	1			1			—			—			1			—			1		
A	6	61	7.0	6	58	8.0	2	21	9.6	—	5	10.4	4	34	7.6	1	24	6.2	—	13	2.9
A + SA	1			1			—			1			—			—			—		
A + SA + D	1			1			1			—			1			—			—		
A + SA + Z	3			3			—			1			3			1			1		
A + Z	41			38			14			1			21			18			11		
A + Z + Cameroon extension	2			2			2			—			2			2			—		
A + Z + Jos extension	1			1			—			1			—			—			—		
A + Z + M	4			4			1			—			2			2			—		
A + Z + D	2			2			1			1			1			—			1		
Z	2	4	0.4	2	4	0.6	—	1	0.4	—	—	—	2	5	1.1	—	1	0.3	—	—	—
Z + M	1			1			1			—			—			1			—		
Z + M + D	1			1			—			—			3			—			—		
G-C	1	15	1.7	1	12	1.7	—	—	—	1	4	8.3	—	6	1.3	—	3	0.8	—	7	1.6
S-Z + G-C	4			3			—			1			2			—			1		
S-Z + G-C + M	1			1			—			—			1			—			—		
S-Z + G	3			3			—			—			—			—			3		
S + G-C	2			2			—			—			2			1			—		
S + G	2			1			—			1			1			1			2		
W/S + G	1			—			—			—			—			—			1		
S + C	1			1			—			1			—			1			—		
Sa-Si	—	51	5.7	—	41	5.6	—	10	4.6	—	—	—	—	28	6.3	—	25	6.4	—	28	6.4
S-Z + Sa-Si	20			18			2			—			12			13			11		
S-Z + M + Sa-Si	1			1			—			—			1			1			—		
S-Z + M + D + Sa-Si	1			1			—			—			1			1			—		
S-Z + D + Sa-Si	1			—			—			—			—			—			1		
S-Z + Med. + Sa-Si	1			1			—			—			1			1			1		
E/S-Z + Sa-Si	1			1			1			—			1			—			—		
S-Z + Med. + I-T + Sa-Si	1			1			—			—			1			1			—		
Sah. + Sa-Si	4			—			—			—			—			—			4		
Sah. + SA + Sa-Si	1			1			—			—			1			1			1		
Sah. + A + SA + Sa-Si	1			1			1			—			—			—			1		
Sah. + A + Sa-Si	3			2			—			—			1			1			2		
E/Sah. + A + SA + Sa-Si	2			2			1			—			1			1			2		
E/Sah. + A + Med. + Sa-Si	1			1			1			—			1			—			1		
Sah. + D + Sa-Si	1			1			—			—			—			1			—		
Sah. + A + Med. + I-T + Sa-Si	2			2			2			—			1			—			—		
S + A + Sah. + Sa-Si	4			2			1			—			2			2			2		
S + A + D + Sa-Si	1			1			—			—			1			1			1		
A + Sa-Si	3			3			1			—			1			1			1		
A + Z + Karoo + Sa-Si	1			1			—			—			1			—			—		
A + Z + Sa-Si	1			1			—			—			1			—			—		
Endemics	11	11	1.2	10	10	1.4	7	7	3.2	1	1	2.1	4	4	0.9	3	3	0.8	2	2	0.5
Boreal	—	17	1.9	—	16	2.2	—	12	5.5	—	—	—	—	6	1.3	—	4	1.0	—	2	0.5
S-Z + M + Med.	1			1			—			—			1			—			—		
S-Z + Med.	3			2			2			—			2			2			2		
S-Z + E/Med.	2			2			1			—			—			1			—		
S + A + D + Med.	1			1			—			—			1			—			—		
A + Z + Med.	1			1			1			—			2			1			—		
A + Z + M + Med.	2			2			1			—			—			—			—		
A + SA + Med.	1			1			1			—			—			—			—		
E/Med.	1			1			1			—			—			—			—		
I-T + Med.	3			3			3			—			—			—			—		
I-T + Cent.Eur. + Med.	1			1			1			—			—			—			—		
I-T + Sa-Si + Med.	1			1			1			—			—			—			—		

Floristic Category	Total Flora			Jebel Marra															Lowland Plain		
				Massif + Piedmont			Upland Grassland			Gallery Forest		Hill Savanna			Piedmont Plain						
	%			%			%			%		%			%			%			
Afr.mont.	43	89	9.9	43	88	12.1	37	78	35.8	1	3	6.2	14	28	6.3	7	11	2.8	—	—	—
Afr.mont. + S-Z	1			1			1			—			1			—			—		
Afr.mont. + M	5			4			4			—			4			—			—		
Afr.mont. + Him.	3			3			3			—			1			—			—		
Afr.mont. + Med.	4			4			4			—			1			—			—		
Afr.mont. + E/Med. + I	1			1			1			—			1			—			—		
Afr.mont. + Hol.	1			1			1			—			1			1			—		
Afr.mont. + Palae.	5			5			4			—			2			—			—		
Afr.mont. + Temp.	1			1			1			—			—			—			—		
Eth.mont.	19			19			18			—			3			3			—		
Eth.mont. + Sa.mont.	2			2			2			1			—			—			—		
Sa.mont.	3			3			1			—			—			—			—		
Sa.mont. + Afr.mont.	1			1			1			1			—			—			—		
	897	100.1		726	100.0		218	100.0		48	99.9		446	100.4		390	100.1		437	99.9	
Cult.	19			11			3			—			10			4			8		
Indet.	18			13			4			2			6			3			5		
	934																				

Appendix E

Savanna trees of Nigeria, Niger and the Sudan Republic

	Nigeria plus Niger	Sudan		Nigeria plus Niger	Sudan
Acacia albida	+	+	Boswellia papyrifera		+
Acacia asak		+	Bridelia ferruginea	+	
Acacia dolichocephala		+	Bridelia scleroneura	+	+
Acacia drepanolobium		+	Burkea africana	+	+
Acacia dudgeoni	+		Butyrospermum paradoxum	+	+
Acacia ehrenbergiana	+	+			
Acacia elatior subsp. turkanae		+	Canthium crassum		+
Acacia etbaica		+	Canthium lactescens		+
Acacia gerrardii	+	+	Canthium schimperanum		+
Acacia gourmaensis	+		Canthium vulgare	+	+
Acacia hecatophylla		+	Cassia arereh	+	+
Acacia hockii	+		Cassia petersiana		+
Acacia kirkii subsp. mildbraedii		+	Cassia sieberana	+	+
Acacia laeta	+	+	Cassia singueana	+	+
Acacia macrostachya	+	+	Celtis integrifolia	+	+
Acacia mellifera		+	Chaetacme aristata	+	+
Acacia nilotica subsp. adansonii	+	+	Combretum andenogonium		+
Acacia nilotica subsp. nilotica	+	+	Combretum collinum subsp. binderanum	+	+
Acacia nilotica subsp. tomentosa	+	+	Combretum collinum subsp. collinum		+
Acacia polyacantha subsp. campylacantha	+	+	Combretum collinum subsp. geitonophyllum	+	
Acacia senegal	+	+	Combretum collinum subsp. hypopilinum	+	+
Acacia seyal var. seyal	+	+	Combretum fragrans	+	+
Acacia seyal var. fistula		+	Combretum gallabatensis		+
Acacia sieberana var. sieberana	+	+	Combretum glutinosum	+	+
Acacia sieberana var. vermoesenii		+	Combretum hartmannianum		+
Acacia sieberana var. villosa	+	+	Combretum molle	+	+
Acacia tortilis subsp. raddiana	+	+	Combretum nigricans var. elliotii	+	+
Acacia tortilis subsp. spirocarpa		+	Combretum schweinfurthii		+
Acacia venosa		+	Commiphora africana	+	+
Adansonia digitata	+	+	Commiphora habessinica		+
Adina microcephala	+	+	Commiphora kerstingii	+	
Afromosia laxiflora	+	+	Commiphora pedunculata	+	+
Afzelia africana	+	+	Commiphora quadricinata	+	+
Albizia amara subsp. sericocephala		+	Cordia abyssinica	+	+
Albizia chevalieri	+		Cordia crenata		+
Albizia coriaria	+	+	Cordia ovalis		+
Albizia malacophylla var. ugandensis	+	+	Cordia rothii	+	+
Allophylus rubifolia		+	Cordyla richardi		+
Amblygonocarpus andongensis	+	+	Crateva adansonii	+	+
Andira inermis	+	+	Crossopteryx febrifuga	+	+
Annona senegalensis	+	+	Croton gratissimus	+	+
Anogeissus leiocarpus	+	+	Cussonia arborea		+
Antidesma venosum	+	+	Cussonia barberi	+	
Azanza garckeana	+	+	Cussonia laciniata		+
Balanites aegyptiaca	+	+	Dalbergia melanoxydon	+	+
Bauhinia rufescens	+	+	Daniella oliveri	+	+
Berchemia discolor		+	Delonix elata		+
Bombax costatum	+		Detarium microcarpum	+	+
Borassus aethiopicum	+	+	Dichrostachys cinerea	+	+
Boscia angustifolia	+	+	Diospyros mespiliformis	+	+
Boscia salicifolia	+	+	Dobera glabra		+
Boscia senegalensis	+	+	Dombeya quinqueseta	+	+
Boswellia dalzielii	+				
Boswellia odorata	+				

	Nigeria plus Niger	Sudan		Nigeria plus Niger	Sudan
<i>Ekebergia senegalensis</i>	+	+	<i>Maytenus ovatus</i>	+	
<i>Enneastemon schweinfurthii</i>		+	<i>Maytenus undatus</i>		+
<i>Entada abyssinica</i>	+	+	<i>Maytenus senegalensis</i>	+	+
<i>Entada africana</i>	+	+	<i>Medemia abiadensis</i> ¹		+
<i>Erythrina senegalensis</i>	+	+	<i>Medemia argun</i>		+
<i>Erythrina sigmoidea</i>	+	+	<i>Mitragyna inermis</i>	+	+
<i>Erythrophleum africanum</i>	+	+	<i>Monotes kerstingii</i>	+	+
<i>Euphorbia candelabrum</i>		+	<i>Moringa peregrina</i>		+
			<i>Morelia senegalensis</i>	+	+
<i>Fagara zanthoxyloides</i>	+		<i>Mundula sericea</i>	+	+
<i>Faurea saligna</i>	+		<i>Mystroxyton aethiopicum</i>		+
<i>Faurea speciosa</i>	+				
<i>Feretia apodanthera</i>	+		<i>Nauclea latifolia</i>	+	+
<i>Ficus abutilifolia</i>	+	+			
<i>Ficus capensis</i>	+	+	<i>Ochna afzelii</i>	+	+
<i>Ficus dekdekana</i>	+	+	<i>Ochna ardisioides</i>		+
<i>Ficus dicranostyla</i>		+	<i>Ochna leucophloeos</i>		+
<i>Ficus glumosa</i>	+	+	<i>Ochna micrantha</i>		+
<i>Ficus gnaphalocarpa</i>	+	+	<i>Ochna schweinfurthiana</i>	+	+
<i>Ficus ingens</i>	+	+	<i>Ostryoderis stuhlmannii</i>	+	
<i>Ficus iteophylla</i>	+	+	<i>Ozoroa insignis</i>	+	+
<i>Ficus platyphylla</i>	+	+	<i>Ozoroa pulcherrima</i>		+
<i>Ficus populifolia</i>	+	+	<i>Ozoroa reticulata</i>		+
<i>Ficus sycomorus</i>	+	+			
<i>Ficus thonningii</i>	+	+	<i>Parinari curatellifolia</i>	+	+
<i>Ficus vallis-chaudae</i>	+	+	<i>Parinari microphylla</i>	+	
<i>Ficus vasta</i>		+	<i>Parinari polyandra</i>	+	+
<i>Flacourtia flavescent</i>	+		<i>Parkia biglobosa</i>		+
			<i>Parkia clappertoniana</i>	+	+
<i>Gardenia aqualla</i>	+	+	<i>Parkia oliveri</i>		+
<i>Gardenia erubescens</i>	+	+	<i>Pavetta crassipes</i>	+	+
<i>Gardenia lutea</i>		+	<i>Phyllanthus discoideus</i>	+	+
<i>Gardenia sokotensis</i>	+		<i>Phyllanthus reticulatus</i>	+	+
<i>Gardenia ternifolia</i>	+	+	<i>Piliostigma reticulatum</i>	+	+
<i>Grewia bicolor</i>	+	+	<i>Piliostigma thonningii</i>	+	+
<i>Grewia mollis</i>	+	+	<i>Pittosporum abyssinicum</i>		+
<i>Grewia villosa</i>	+	+	<i>Prosopis africana</i>	+	+
			<i>Protea elliotti</i>	+	
<i>Haematostaphis barteri</i>	+	+	<i>Protea gaguedi</i>		+
<i>Hannoa schweinfurthii</i>		+	<i>Protea madiensis</i>	+	+
<i>Hannoa undulata</i>	+		<i>Pseudocedrela kotschy</i>	+	+
<i>Haplocoelum foliosum</i>		+	<i>Psorospermum febrifugum</i>	+	
<i>Hexalobus monopetalus</i>	+	+	<i>Pteleopsis habeensis</i>	+	
<i>Hymenocardia acida</i>	+	+	<i>Pteleopsis suberosa</i>	+	
<i>Hymenodictyon floribunda</i>	+	+	<i>Pterocarpus erinaceus</i>	+	
<i>Hyphaene thebaica</i>	+	+	<i>Pterocarpus lucens</i>	+	+
			<i>Pterolobium stellatum</i>		+
<i>Isobertlinia doka</i>	+	+			
<i>Isobertlinia tomentosa</i>	+	+	<i>Rhus abyssinica</i>		+
			<i>Rhus natalensis</i>	+	+
<i>Khaya senegalensis</i>	+	+	<i>Rhus vulgaris</i>		+
<i>Kigelia africana</i>	+	+			
			<i>Salvadora persica</i>	+	+
<i>Lannea acida</i>	+		<i>Sclerocarya birrea</i>	+	+
<i>Lannea egregia</i>	+		<i>Securidaca longipedunculata</i>	+	+
<i>Lannea fruticosa</i>	+	+	<i>Sorindeia schweinfurthii</i>		+
<i>Lannea humilis</i>	+	+	<i>Steganotaenia araliacea</i>	+	+
<i>Lannea kerstingii</i>	+	+	<i>Sterculia africana</i>		+
<i>Lannea microcarpa</i>	+		<i>Sterculia setigera</i>	+	+
<i>Lannea schimperi</i>	+	+	<i>Stereospermum kunthianum</i>	+	+
<i>Lannea schweinfurthii</i>		+	<i>Strychnos innocua</i>	+	+
<i>Lonchocarpus laxiflorus</i>	+	+	<i>Strychnos spinosa</i>	+	+
<i>Lophira lanceolata</i>	+	+	<i>Swartzia madagascariensis</i>	+	
			<i>Syzygium guineense</i>	+	+
<i>Maerua angolensis</i>	+	+			
<i>Maerua crassifolia</i>	+	+	<i>Tamarindus indica</i>	+	+
<i>Maprounea africana</i>	+		<i>Tamarix aphylla</i>		+

	Nigeria plus Niger	Sudan		Nigeria plus Niger	Sudan
Tamarix nilotica		+	Vitex chrysocarpa	+	
Tamarix senegalensis	+		Vitex domiana		+
Teclea noblis		+	Vitex fischeri	+	+
Terminalia avicennioïdes	+	+	Vitex madiensis	+	+
Terminalia brownii	+	+	Vitex simplicifolius	+	+
Terminalia glaucescens	+	+			
Terminalia laxiflora	+	+	Xeromphis nilotica	+	+
Terminalia macroptera	+	+	Ximemia americana	+	+
Terminalia mollis	+	+			
Terminalia salicifolia		+	Ziziphus abyssinica	+	+
Terminalia spinosa		+	Ziziphus lotus subsp. saharae	+	
Trichilia roka	+	+	Ziziphus mauritiana	+	+
Turraea nilotica		+	Ziziphus mucronata	+	
Turraea vogelii		+	Ziziphus pubescens		+
			Ziziphus spina-christi	+	+
Uapaca togoënsis	+				
Uvaria bakobensis		+			
Uvaria schweinfurthii		+			

(1) *Medemia abiadensis* H.Wendl. is considered to be a synonym of *H. argun* (Mart.) Württenb. ex H.Wendl.; see Täckholm & Drar, Fl. Egypt 2:296 (1950) and Boulos in Bot. Not. 121:117 (1968).

Distribution Maps

Note

- (1) Localities of specimens noted in the literature but not seen by me have been marked with open symbols thus '○'
- (2) A topographic overlay to these maps will be found in the pocket of the rear cover.



Map 1 [1] *Clematis hirsuta* Guill. & Perr.



Map 2 [2] *Clematis sinensis* Fresen.

Map 4 [5] *Ceratophyllum demersum* L.



Map 3 [4] *Ranunculus multifidus* Forsk.





Map 6 [7] *Nymphaea lotus* L.



Map 5 [6] *Nymphaea caerulea* Sav.

Map 8 [9] Chasmanthera dependens Hochst.



Map 7 [8] Nymphaea maculata Schumm. & Thonn.





Map 10 [11] *Wormskiodia pilosa* (Willd.) Schweinf. ex Urb.



Map 9 [10] *Cissampelos mucronata* A.Rich.

Map 14 [13] *Boscia senegalensis* (Pers.) Lam. ex Poir.



Map 11 [12] *Boscia salicifolia* Oliv.





Map 14 [15] *Cadaba glandulosa* Forsk.



Map 13 [14] *Cadaba farinosa* Forsk. subsp. *farinosa*

Map 15 [17] *Capparis decidua* (Forsk.) Edgew.



Map 16 [18] *Capparis fascicularis* DC. var. *fascicularis*





Map 17 [20] *Capparis sepiaria* L. var. *fischeri* (Pax) DeWolf



Map 18 [21] *Cleome monophylla* L.

Map 20 [24] *Maerua angolensis* DC.



Map 19 [22] *Cratva adansonii* DC. subsp. *adansonii*





Map 22 [26] *Maerua pseudopetalosa* (Gilg & Bened.) DeWolf



Map 21 [25] *Maerua oblongifolia* (Forsk.) A.Rich.

Map 24 [28] *Farsetia longisiliqua* Decne.



Map 23 [27] *Capsella bursa-pastoris* (L.) Medic.





Map 25 [29] *Farsctia stenoptera* Hochst.



Map 26 [31] *Nasturtium microphyllum* Boenn. ex Reichenb. *
[32] *Nasturtium officinale* R.Br. ●

Map 28 [38] *Securidaca longepedunculata* Fresen.



Map 27 [34] *Polygala abyssinica* R.Br. ex Fresen.





Map 30 [40] *Crassula pharnaceoides* Fischer & C. A. Mey.



Map 29 [39] *Crassula pentandra* (Royle ex Edgew.) Schoenl.

Map 32 [43] *Umbilicus botryoides* Hochst. ex A.Rich.

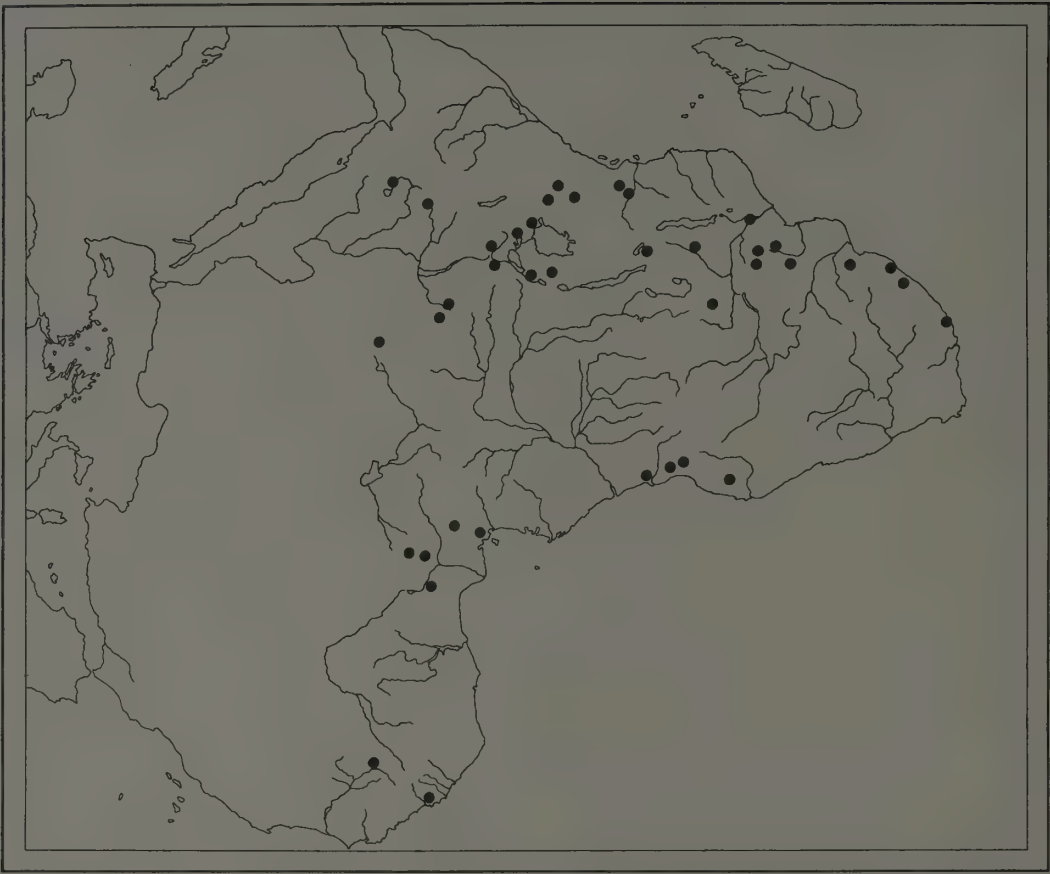


Map 31 [41] *Kalanchoë lanceolata* (Forsk.) Pers. var. *lanceolata* ●
[42] *Kalanchoë lanceolata* (Forsk.) Pers. var. *glandulosa* (Hochst. ex A.Rich.) Cuf. ▲





Map 33 [44] *Vahlia dichotoma* (Murray) Kuntze



Map 34 [45] *Tristachya trifaria* (Bory ex Willd.) Spreng.

Map 36 [47] *Cerastium fontanum* Baumg. subsp. *triviale* (Link.) Jalas



Map 35 [46] *Arenaria leptoclados* (Reichb.) Guss.





Map 38 [49] *Drymaria cordata* (L.) Willd. ex Roem. & Schultes



Map 37 [48] *Cerastium octandrum* Hochst. ex A. Rich.

Map 40 [53] *Silene burchelli* Orth ex. DC.



Map 39 [50] *Minuartia filifolia* (Forsk.) Mattfeld





Map 42 [67] *Rumex bequaertii* De Wild.



Map 41 [54] *Silene lynesii* Norman *
[55] *S. macrosolen* Steud. ex A. Rich. ●
S. villosa Forsk. *

Map 44 [74] *Aerva javanica* (Burm.f.) Juss. ex Schult.

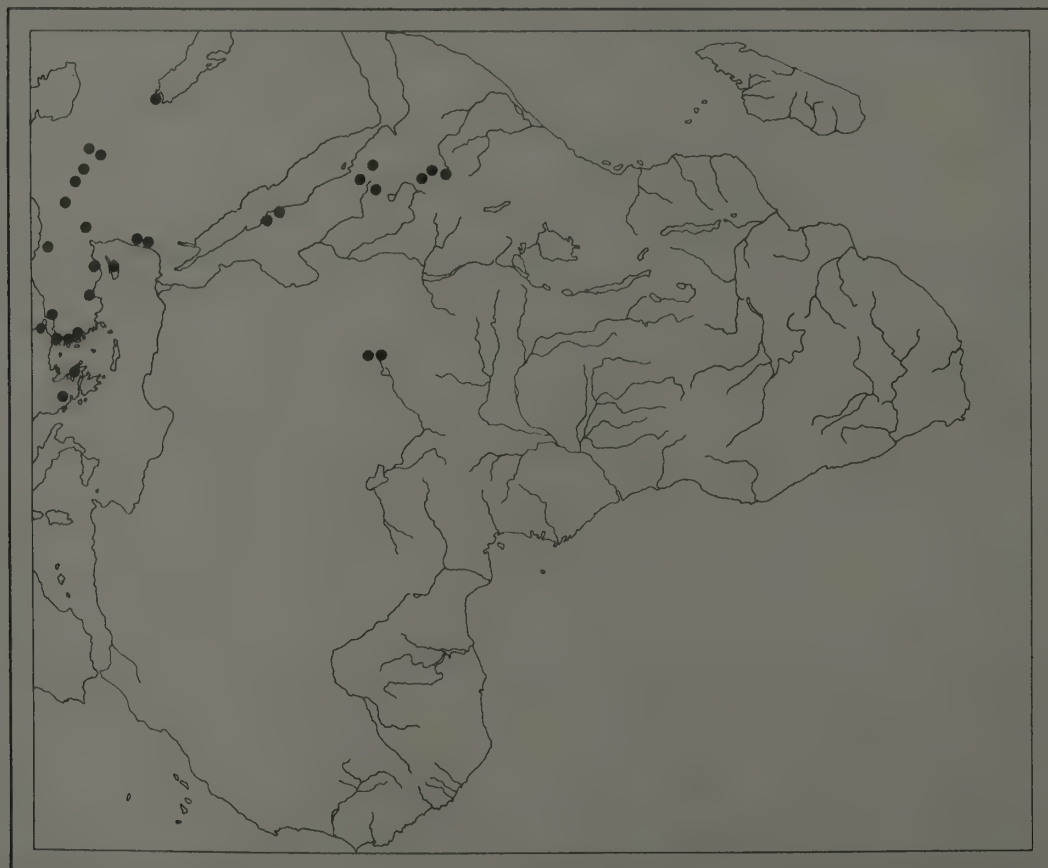


Map 43 [68] *Cometes abyssinica* R.Br.





Map 46 [88] *Erodium malacoides* (L.) L'Hérit.



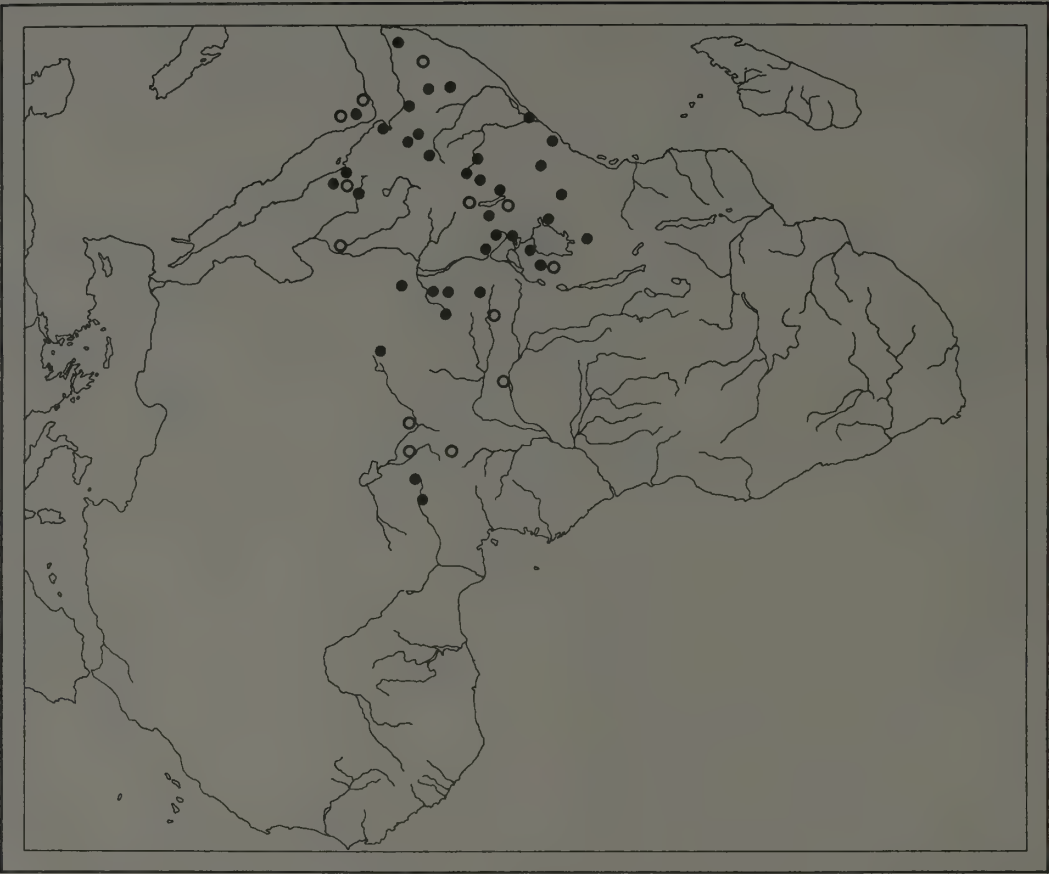
Map 45 [86] *Linum strictum* L. subsp. *corymbulosum* (Reichenb.) Rouy

Map 48 [102] *Woodfordia uniflora* (A.Rich.) Koehne



Map 47 [89] *Geranium ocellatum* Jacquem. ex Cambess.





Map 50 [116] *Adenia venenata* Forsk.



Map 49 [114] *Casaria barteri* Masters

Map 52 [130] *Derosiphia tubulosa* (Sm.) Raf.



Map 51 [126] *Zehneria minutiflora* (Cogn.) Jeffrey





Map 54 [132] *Combretum aculeatum* Vent.



Map 53 [131] *Anogeissus leiocarpus* (DC.) Guill. & Perr.

Map 56 [138] *Guiera senegalensis* J.F.Gmel.



Map 55 [135] *Combretum glutinosum* Perr. ex DC.





Map 58 [140] *Terminalia laxiflora* Engl.



Map 57 [139] *Terminalia brownii* Fresen.

Map 60 [153] *Dombeya quinqueseta* (Del.) Exell var. *quinqueseta*

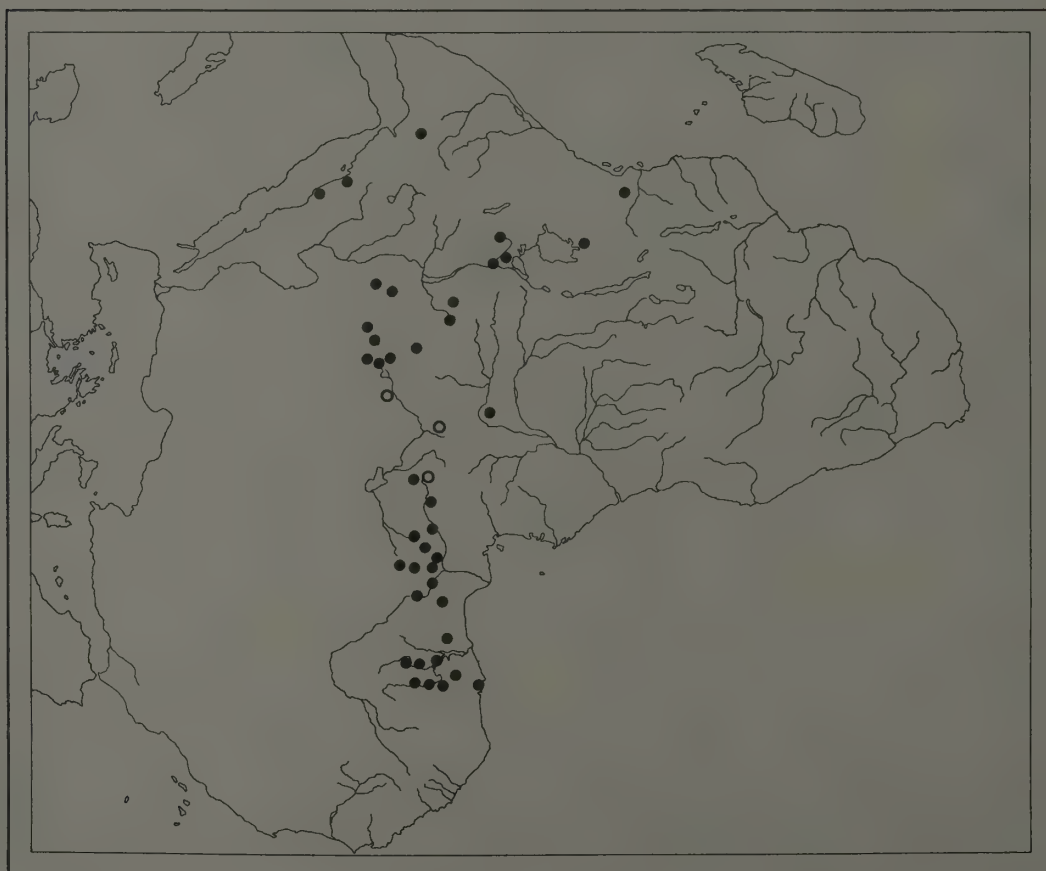


Map 59 [141] *Hypericum perforatum* L.





Map 62 [160] *Azanza garckeana* (F. Hoffm.) Exell & Hillcoat



Map 61 [155] *Sterculia setigera* Del.



Map 64 [179] *Bridelia ndellensis* Beille

Map 63 [178] *Andriachne aspera* Spreng.



Map 66 [196] *Bauhinia rufescens* Lam.



Map 65 [186] *Euphorbia nubica* N.E.Br.

Map 63 [210] *Acacia mellifera* (Vahl) Benth. subsp. *mellifera*



Map 67 [204] *Ptilostigma reticulatum* (DC.) Hochst.





Map 69 [211] *Acacia nilotica* (L.) Willd. ex Del. subsp. nilotica ●
[212] *Acacia nilotica* (L.) Willd. ex Del. subsp. adansonii (Guill. & Perr.) Brenan ▲



Map 70 [213] *Acacia nubica* Benth.

Map 72 [216] *Acacia seyal* Del. var. *seyal*



Map 71 [215] *Acacia senegal* (L.) Willd. var. *senegal*





Map 73 [217] *Acacia sieberana* DC. var. *sieberana* ●
 [218] *Acacia sieberana* DC. var. *villosa* A. Chev. ▼
 [219] *Acacia sieberana* DC. var. *vermosceni* (DeWild.) Keay & Brenan ▲

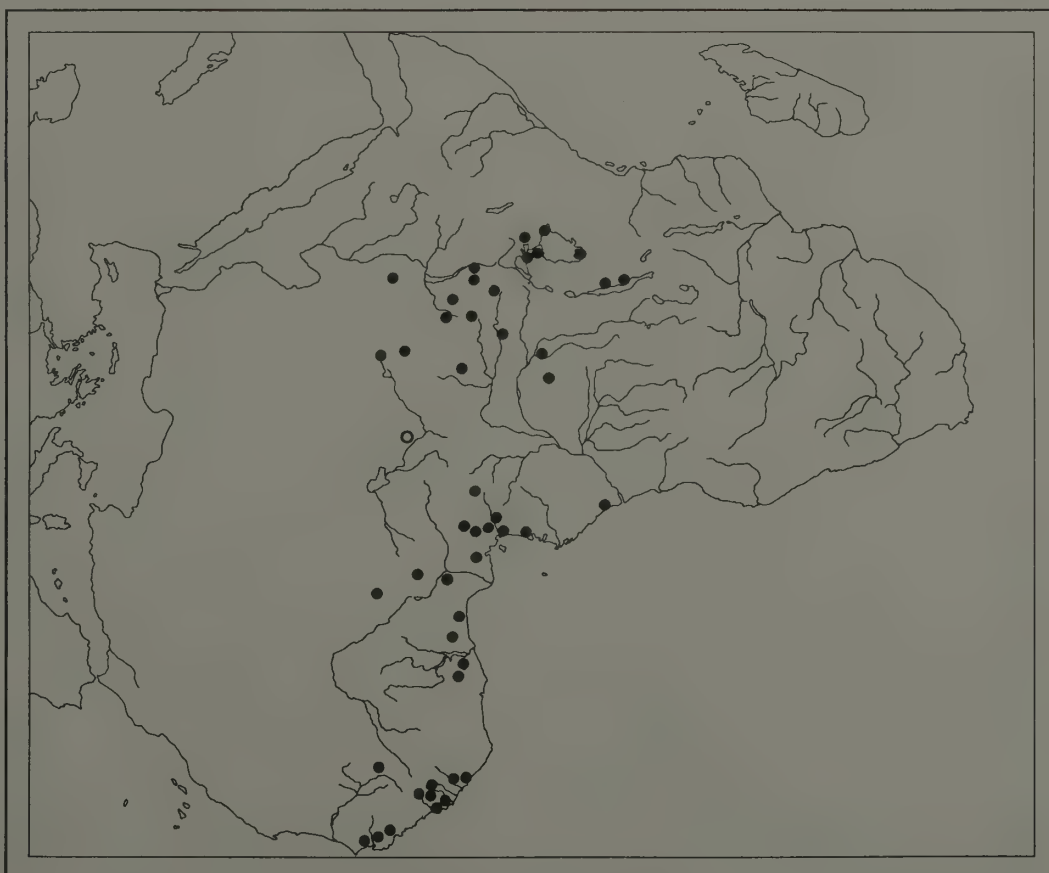


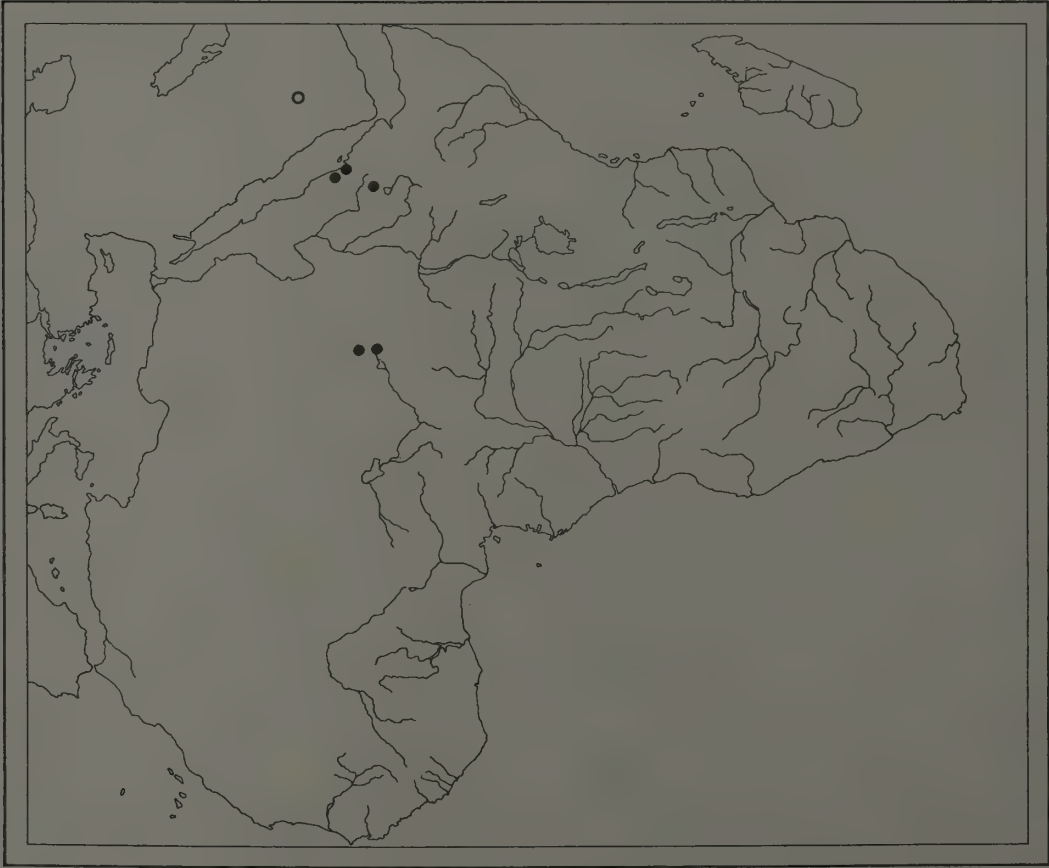
Map 74 [225] *Albizia aylmeri* Hutch. *
 A. *malacophylla* (Steud. ex A. Rich.) Walp. var. *malacophylla* ●
 [226] A. *malacophylla* (Steud. ex A. Rich.) Walp. var. *ugandensis* Bak. f. ▲

Map 76 [242] *Argyrolobium arabicum* (Decn.) Jaub. & Spach



Map 75 [227] *Albizia zygia* (DC.) Macbr.





Map 77 [243] *Astragalus atropilosulus* (Hochst.) Bunge
subsp. *abyssinicus* (Hochst.) Gillett var. *abyssinicus*



Map 78 [224] *Biserrula pelecinus* L. subsp. *leiocarpa* (A. Rich.) Gillett ▲
Biserrula pelecinus L. subsp. *pelecinus* ●

Map 80 [272] *Indigofera costata* Guill. & Perr. subsp. *costata*



Map 79 [268] *Erythrina sigmoidea* Hua





Map 82 [283] *Lonchocarpus laxiflorus* Guill. & Perr.



Map 81 [274] *Indigofera longicalyx* Gillett

Map 84 [288] *Pterocarpus lucens* Lepr. ex Guill. & Perr.



Map 83 [284] *Lotononis platycarpus* (Viv.) Pic.-Serm.



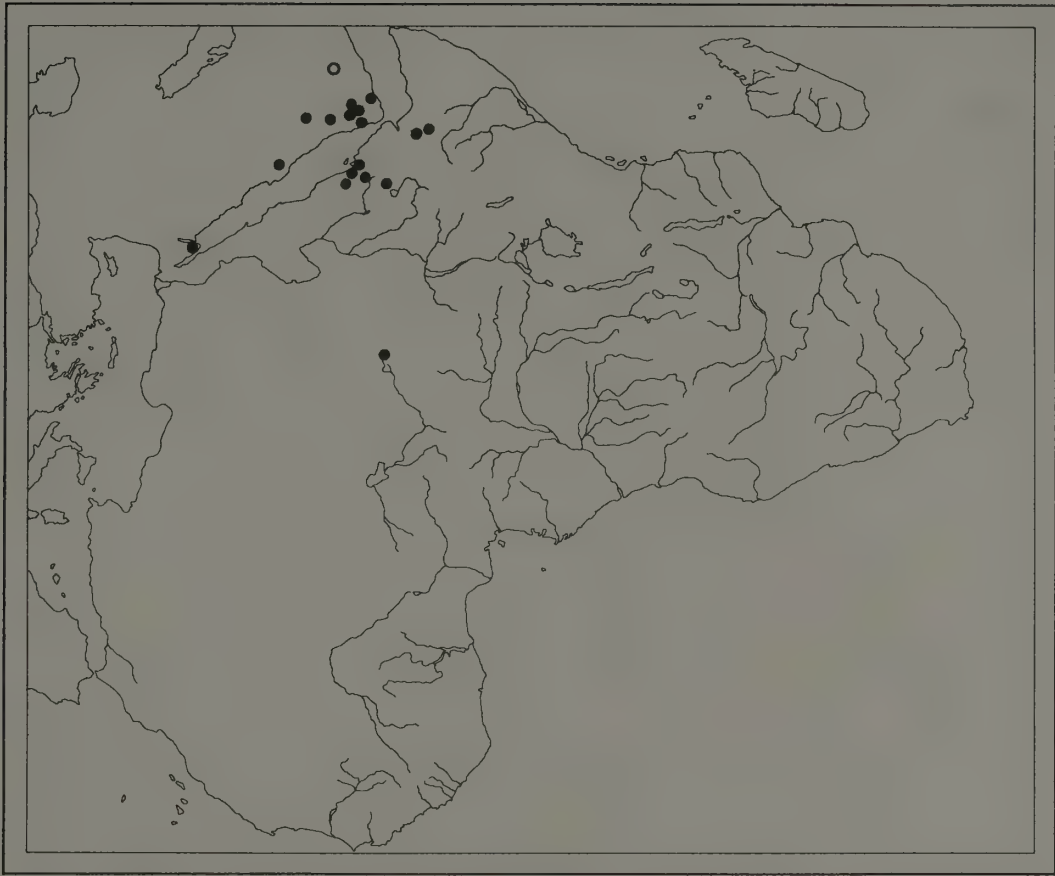


Map 85 [298] *Vermifruux abyssinica* (A. Rich.) Gillett



Map 86 [305] *Celtis integrifolia* Lam. (fossil records X)

Map 88 [313] *Ficus palmata* Forsk.



Map 87 [306] *Trema orientalis* (L.) Bl.





Map 90 [321] *Parietaria debilis* Forst.f.



Map 89 [316] *Ficus sur* Forsk.

Map 92 [339] *Cyphostemma sesquipedalis* (Gilg) Descouings

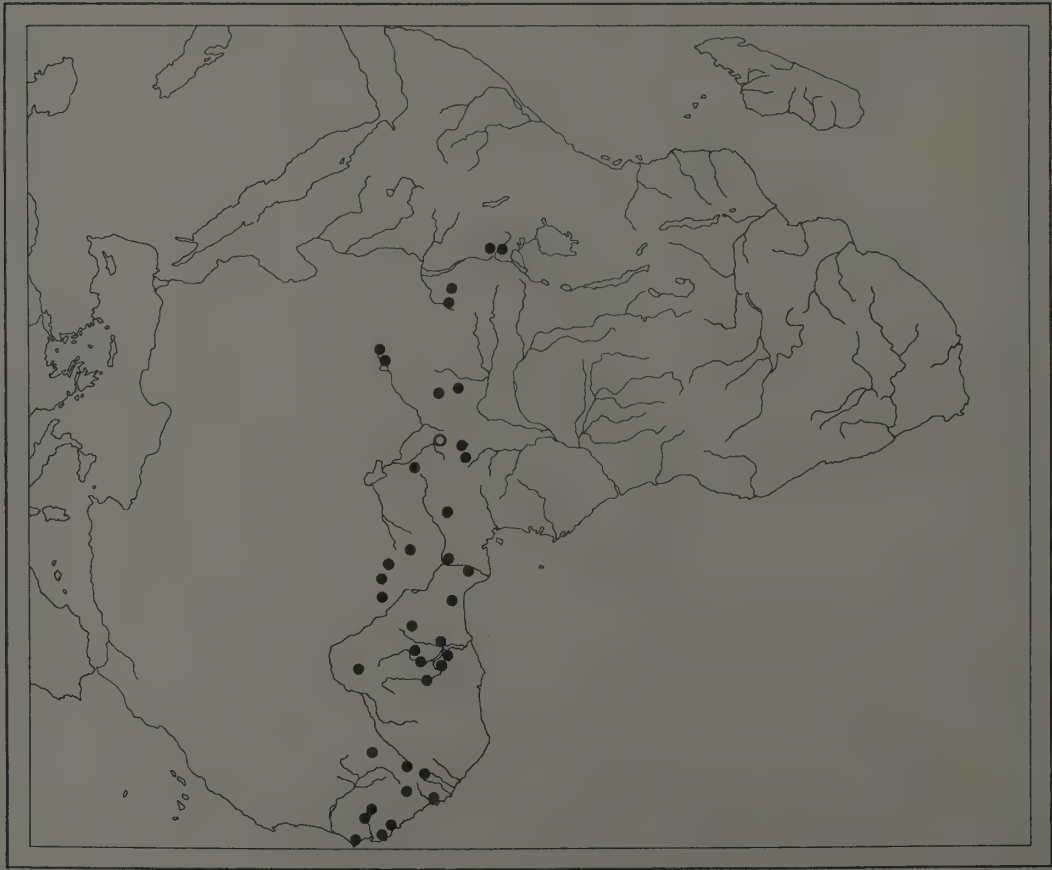


Map 91 [336] *Cyphostemma crinita* (Planch.) Descouings





Map 94 [348] *Pseudocedrela kotschyi* (Schweinf.) Harms



Map 93 [347] *Khaya senegalensis* (Desr.) A. Juss.

Map 96 [361] *Cussonia arborea* Hochst. ex A.Rich.



Map 95 [359] *Rhus vulgaris* Meikle





Map 98 [364] *Berula erecta* (Huds.) Coville



Map 97 [362] *Polyscias fulva* (Hiern) Harms

Map 100 [368] *Diplolephium africanum* Turcz.



Map 99 [365] *Caucalis melanantha* (Hochst.) Hiern





Map 102 [371] *Hydrocotyle ranunculoides* L.f.



Map 101 [369] *Ferula communis* L.

Map 104 [373] *Torilis arvensis* (Huds.) Link



Map 103 [372] *Steganotaenia araliacea* Hochst.





Map 106 [381] *Olea laperrinei* Batt. & Trab.



Map 105 [374] *Blaeria spicata* Hochst. ex A. Rich. subsp. *spicata*

Map 108 [386] *Caralluma* sp. aff. *vittata* N.E.Br.



Map 107 [385] *Calotropis procera* (Ait.) Ait.f.





Map 110 [396] *Anthospermum pachyrrhizum* Hiern



Map 109 [389] *Gomphocarpus fruticosus* (L.) Ait.f.

Map 112 [409] *Mitragyna inermis* (Willd.) Kuntze



Map 111 [402] *Galium thunbergianum* Eckl. & Zeyh.



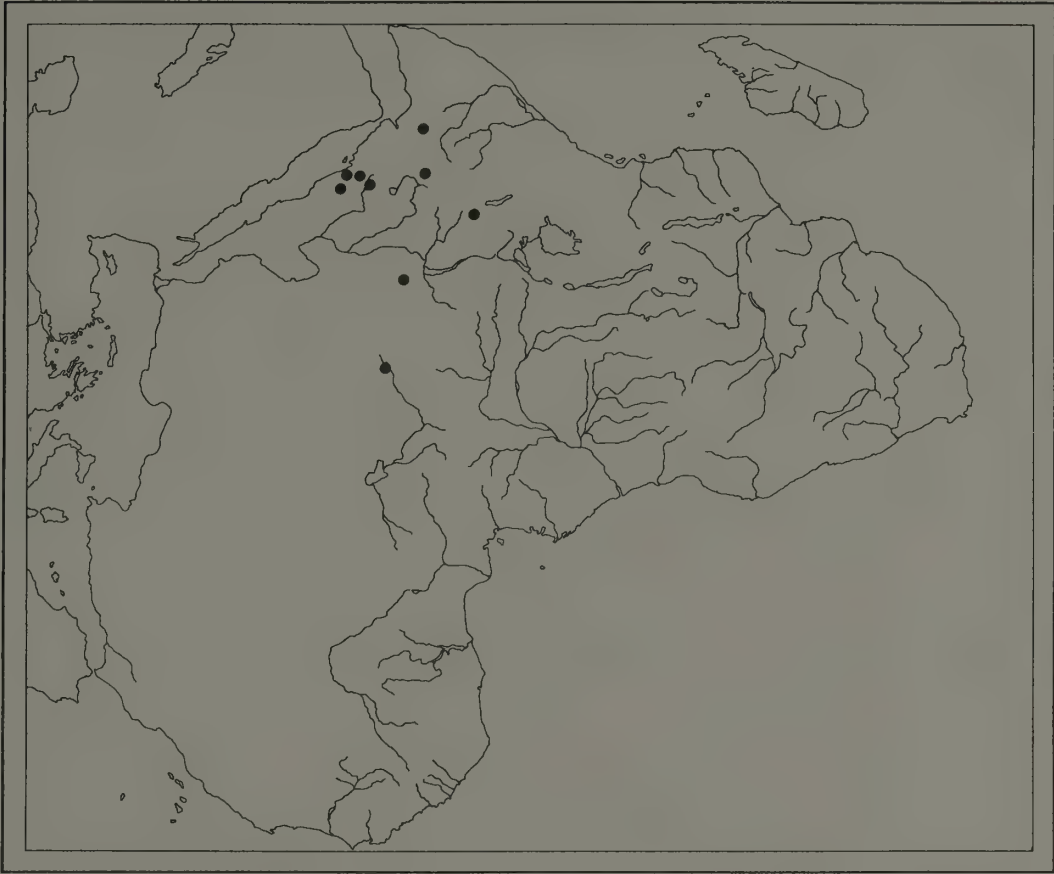


Map 114 [412] *Oldenlandia echinulosa* K. Schum.



Map 113 [410] *Mussaenda arcuata* Lam. ex Poir.

Map 116 [429] *Bidens prestinaria* (Sch.Bip.) Cuf.



Map 115 [427] *Bidens chaetondonta* Sherff





Map 117 [432] *Centaurea senegalensis* DC.



Map 118 [436] *Conyza pyrthopappa* Sch. Bip. ex A. Rich. subsp. pyrthopappa

Map 120 [441] *Crepis rueppellii* Sch. Bip.



Map 119 [437] *Conyza schimperi* Sch. Bip. ex A. Rich. subsp. *schimperi*





Map 122 [445] *Echinops longifolius* A. Rich.



Map 121 [444] *Echinops boranensis* Lanza

Map 124 [449] *Felicia dentata* (A.Rich.) Dandy subsp. *nubica* Grau▲
Felicia dentata (A.Rich.) Dandy subsp. *dentata*●



Map 123 [446] *Echinops macrochaetus* Fresen.





Map 126 [455] *Gnaphalium schultzei* Mendonça



Map 125 [454] *Gnaphalium undulatum* L.

Map 128 [465] *Melanthera pungens* Oliv. & Hiern



Map 127 [461] *Laggera braunii* Vathe





Map 129 [466] *Osteospermum vaillantii* (Decn.) Norlindh



Map 130 [468] *Phagnalon scalarum* Schweinf. ex Schwartz var. *scalarum* ●
[469] *Phagnalon scalarum* Schweinf. ex Schwartz var. *meridionale* (Quézel) Wickens ▲

Map 132 [474] *Pulicaria undulata* (L.) C.A.Mey.

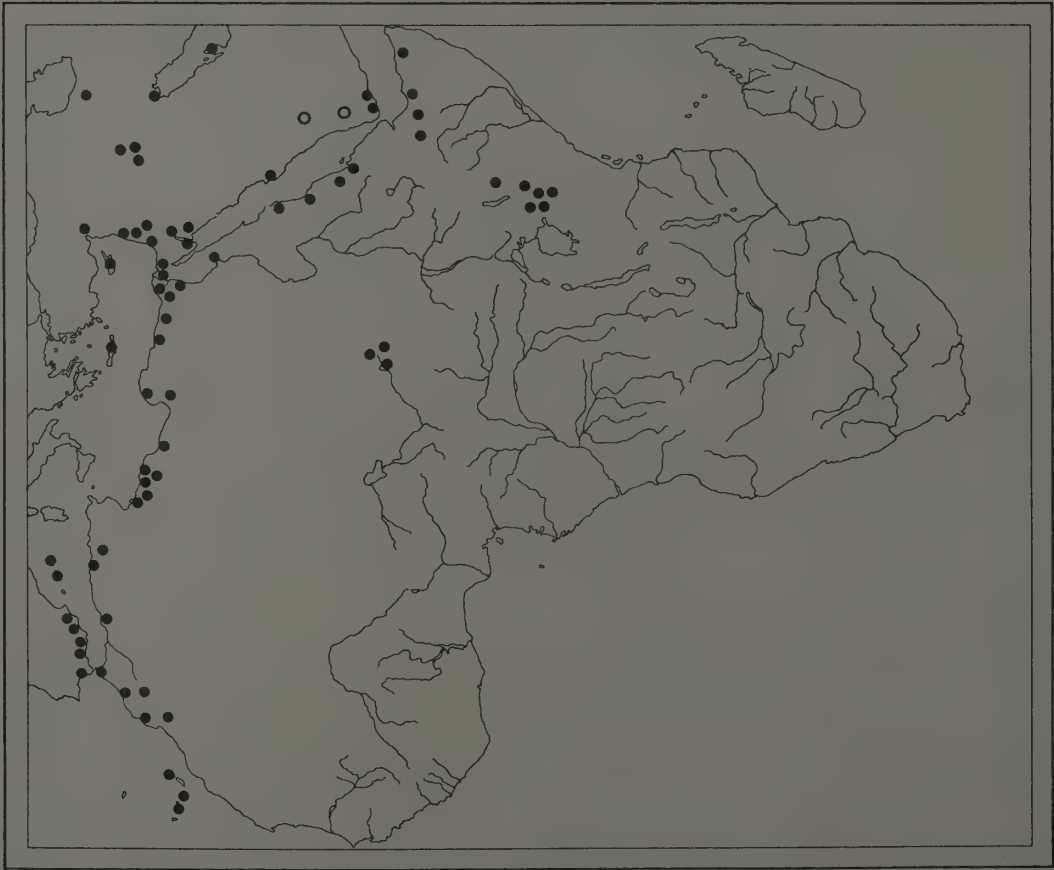


Map 131 [472] *Pulicaria crispa* (Forsk.) Oliv.





Map 134 [478] *Senecio hochstetteri* Sch.Bip. ex A.Rich.



Map 133 [475] *Reichardia tingitana* (L.) Roth

Map 136 [492] *Vernonia richardiana* (Kuntze) Pic.-Serm.



Map 135 [479] *Senecio tuberosus* Sch. Bip. ex A. Rich.





Map 138 [498] *Asterolinon adäensis* Kuntze ●
A. linum-stellatum (L.) Duby *



Map 137 [496] *Swertia abyssinica* Hochst. ●

Map 140 [502] *Arnebia hispidissima* (Sieber ex Lehm.) DC.



Map 139 [500] *Campanula edulis* Forsk.





Map 142 [535] *Ipomoea verbascoidea* Choisy



Map 141 [509] *Myosotis abyssinica* Boiss. & Reut.

Map 144 [540] *Bellardia trixago* (L.) All.



Map 143 [539] *Alectra sessiliflora* (Vahl) Kuntze var. *senegalensis* (Benth.) Hepper





Map 145 [542] *Celsia sudanica* (Murbeck) Wickens ★
Celsia pedunculosa Steud. & Hochst. ex Benth. ●



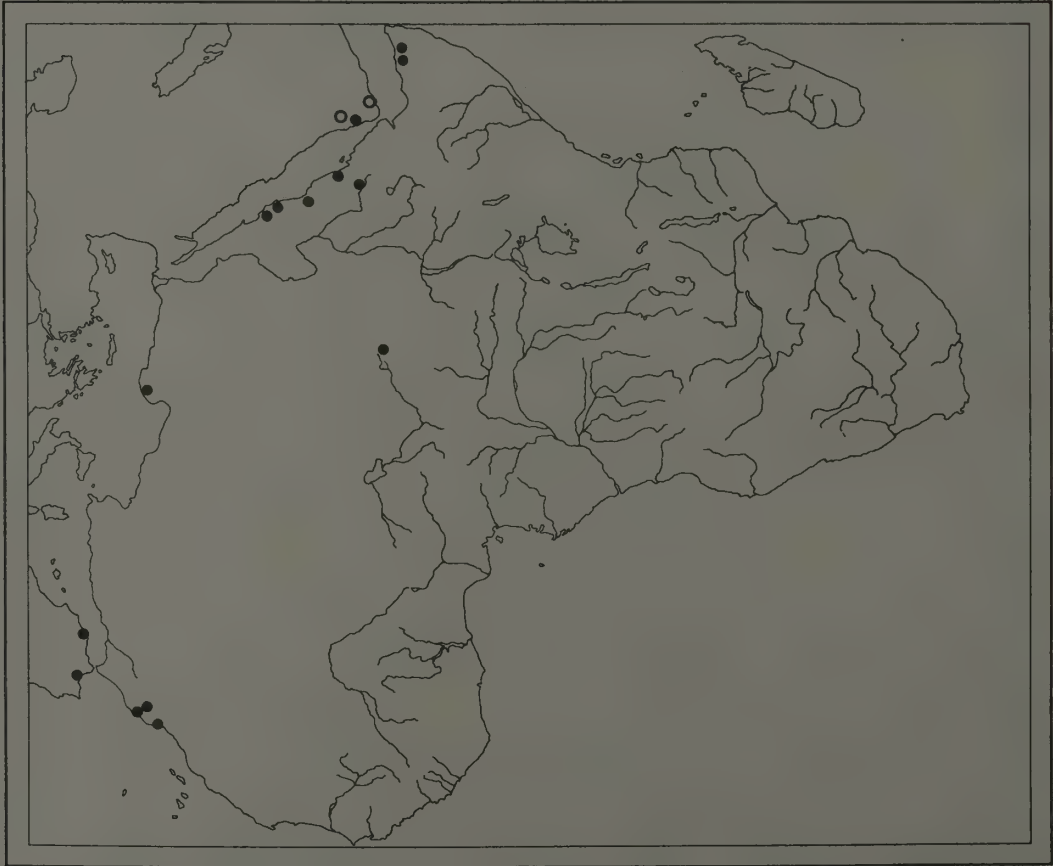
Map 146 [543] *Craterostigma plantagineum* Hochst. ●

Map 148 [551] *Parentuccella latifolia* (L.) Caruel



Map 147 [550] *Misopates orontium* (L.) Raf.





Map 149 [554] *Scrophularia arguta* Sol.



Map 150 [560] *Verbascum sinaiticum* Benth.

Map 152 [591] *Vitex doniana* Sweet



Map 151 [589] *Lippia multiflora* Moldenke





Map 154 [601] *Mentha longifolia* (L.) Hudson



Map 153 [598] *Lavandula pubescens* Decne.

Map 155 [602] *Nepeta ballotifolia* Hochst. ex A.Rich.



Map 156 [605] *Otostegia fruticosa* (Forsk.) Briq. subsp. *fruticosa* ●
Otostegia fruticosa (Forsk.) Briq. subsp. *schimperii* (Benth.) Sebald ▲





Map 158 [624] *Cyanotis barbata* D. Don

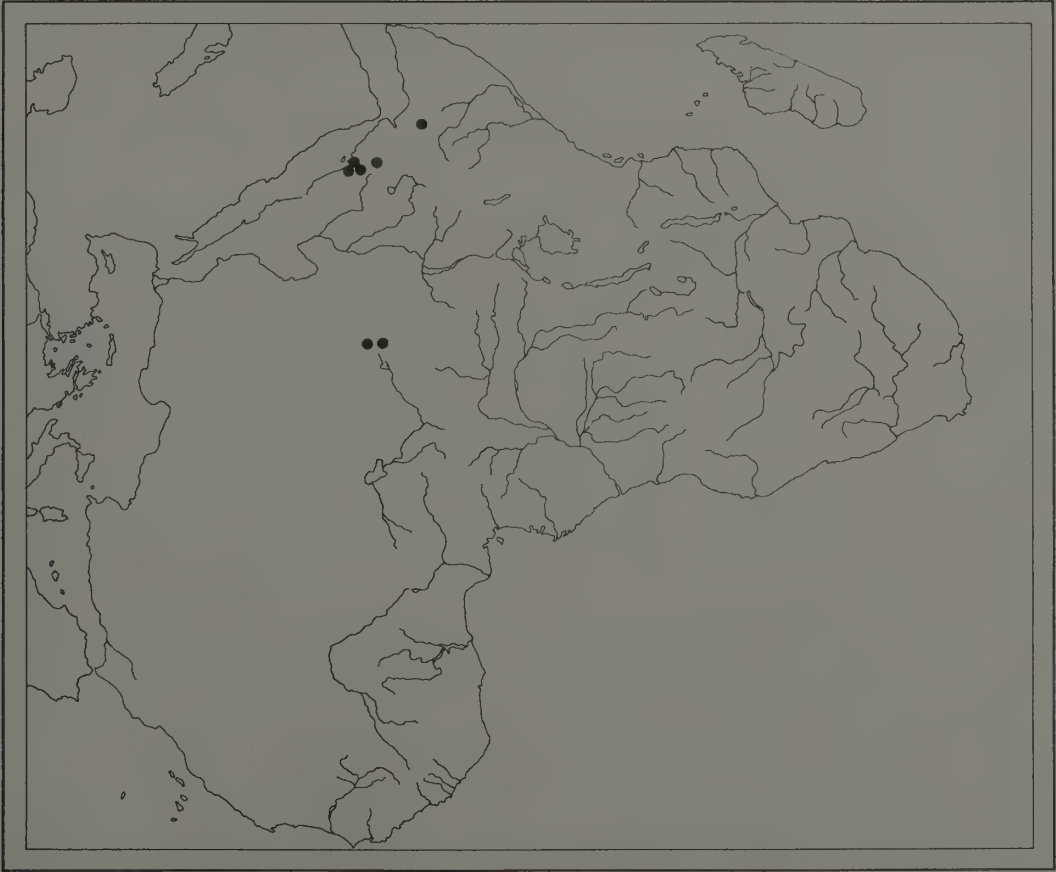


Map 157 [608] *Satureja punctata* (Benth.) Briq.

Map 160 [636] *Chlorophytum geophilum* Peter ex Poelln.



Map 159 [630] *Alot elegans* Tod.





Map 162 [659] *Lapciroisia schimperi* (Aschers. & Klatt) Milne-Redh.



Map 161 [640] *Drimiopsis barteri* Baker

Map 164 [663] *Sansevieria liberica* Gér. & Labr.



Map 163 [660] *Romulea camerooniana* Baker





Map 166 [670] *Ansellia gigantea* Reichenb.f. var. *nilotica* (Baker) N.E. Brown



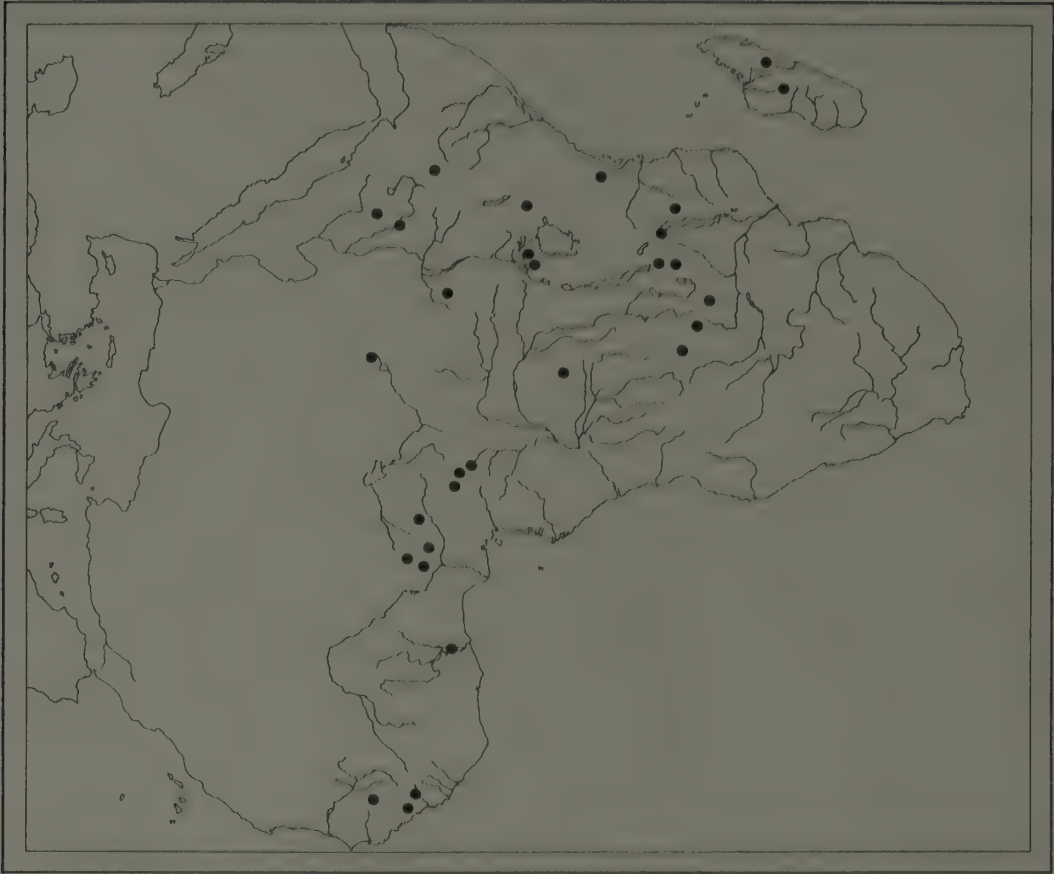
Map 165 [668] *Hypoxis angustifolia* Lam.

Map 168 [672] *Habenaria armatissima* Reichenb.f.



Map 167 [671] *Disperis anthoceros* Reichenb.f. var. *anthoceros*





Map 170 [671] *Habenaria cirrhata* (Lindl.) Reichenb.f.



Map 169 [673] *Habenaria bongensis* Reichenb.f.

Map 172 [676] *Habenaria humilior* Reichenb.f.



Map 171 [675] *Habenaria filicornis* Lindl.





Map 173 [679] *Holothrix tridentata* (Hook.f.) Reichenb.f.



Map 174 [680] *Nervilia kotschyi* (Reichenb.f.) Schlechter

Map 176 [683] *Juncus dregeanus* Kunth subsp. *bachitii* Steud. Hedberg



Map 175 [681] *Satyrion coriophoroides* A.Rich.





Map 178 [107] *Kyllinga chlorotropis* Steud.



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Map 180 [728] *Agrostis lachnantha* Nees



Map 179 [727] *Pycreus mundtii* (Nees) Kunth





Map 181 [729] *Aira caryophyllea* L.



Map 182 [731] *Andropogon distachyos* L.

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Map 183 [735] *Andropogon longipes* Hackel





Map 186 [765] *Bromus leptoclados* Nees



Map 185 [764] *Brachypodium sylvaticum* (Hudson) P. Beauv.

Map 188 [767] *Calamagrostis epigejos* (L.) Roth var. *capensis* Stapf

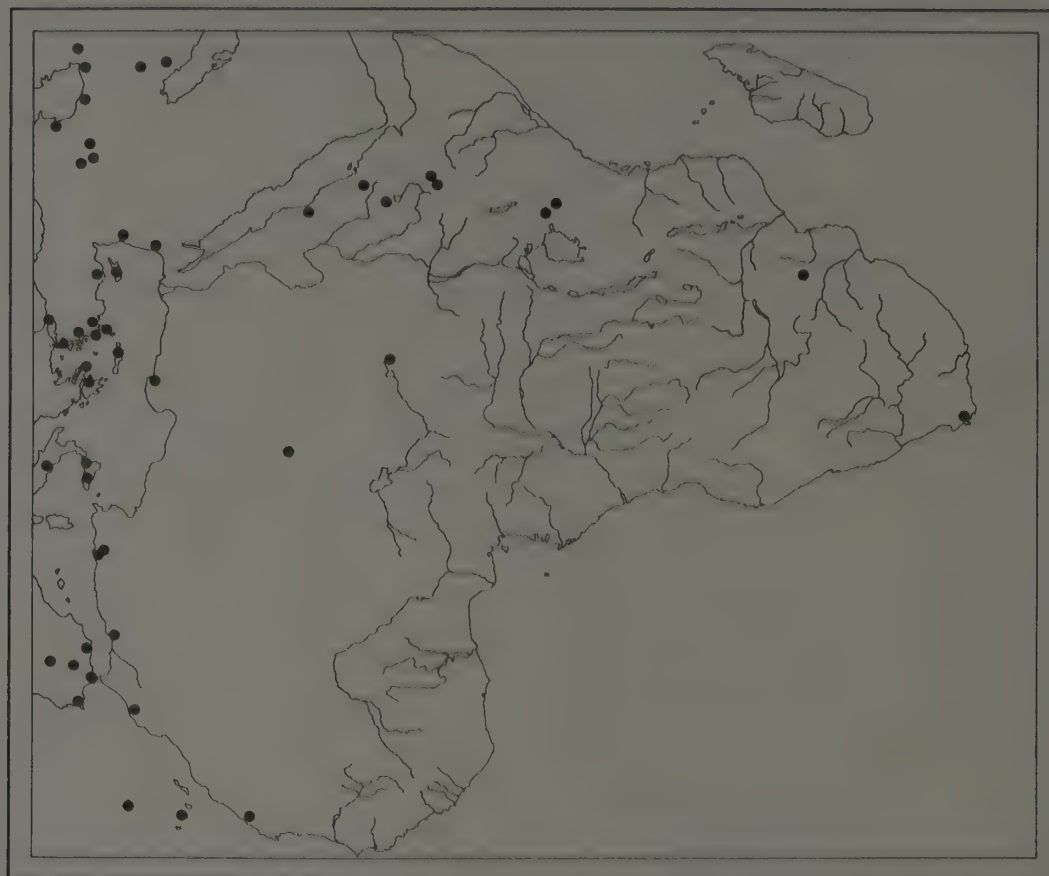


Map 187 [766] *Bromus pectinatus* Thunb.





Map 189 [825] *Festuca abyssinica* A. Rich. var. *abyssinica*



Map 190 [826] *Gastrodium phleoides* (Nees & Meyen) C.E. Hubbard

Map 192 [844] *Hyparrhenia multiplex* (Hochst. ex A. Rich.) Anders. ex Stapf



Map 191 [829] *Helictotrichon elongatum* (Hochst. ex A. Rich.) C.E. Hubbard





Map 194 [861] *Melinis tenuinervis* Stapf



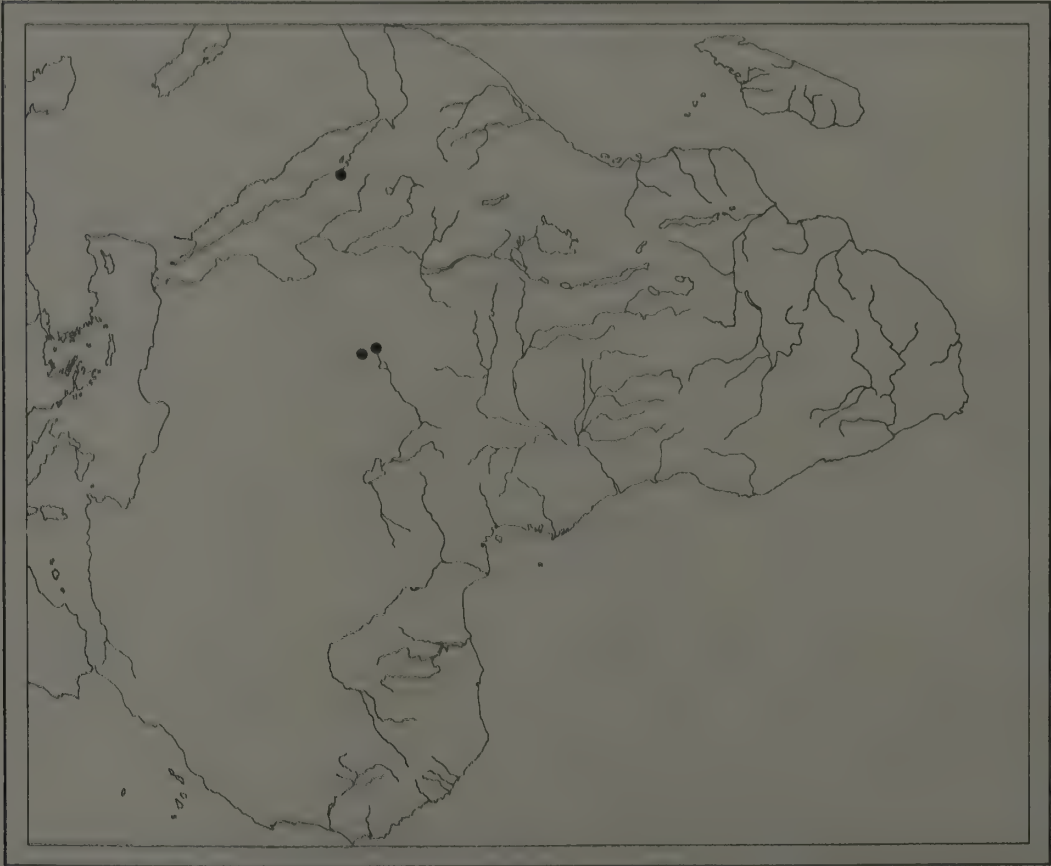
Map 193 [856] *Lophochloa phleoides* (Vill.) Reichenb.

Map 196 [879] *Pennisetum glabrum* Steud.



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Map 197 [886] *Pennisetum gracilescens* Hochst.



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Map 200 [88g] *Poa bulbosa* L. var. *vivipara* Koel.



Map 199 [887] *Phaenanthoecium kostini* (Hochst. ex A.Rich.) C.E. Hubbard





Maps 202 [894] *Rhynchelytrum longisetum* (Hochst. ex A.Rich.) Stapf & Hubbard



Maps 201 [890] *Poa leptoclada* Hochst. ex A.Rich.

Map 204 [907] *Setaria lyncsii* Stapf & Hubbard



Map 203 [902] *Schoenefeldia gracilis* Kunth





Map 206 [928] *Tripogon leptophyllus* (A. Rich.) Cuf.



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Index of Vernacular Names

The Fur and Arabic vernacular names contained in the check list have been compiled with the assistance of Sayed Adam Saleh, who acted as an interpreter on many of my collecting trips. The English spelling approaches as close as possible to the local Fur or Arabic pronunciation, but certain tonal differences are impossible to transcribe. In Fur certain letters such as 's' and 'z', 'g' and 'k', 'f', 'p' and 'y', and more rarely 'sh' and 'sh' are interchangeable. The 'rr' is rolled; 'gn' is pronounced like the French in 'montagne'. 'Ah', 'ch', 'ch', etc are equivalent to the English ejaculations.

The following sentences in Fur are useful when collecting vernacular names:

Ing kurung konna isse longa	What is the name of this tree?
Ing kuruh see i karia	What is the name of this tree?
Ing daaing konna isee longa	What is the name of this grass/herb?
Ing daai see i karia	What is the name of this grass/herb?
Ka as alungba	I don't know
(I not know)	

Some Fur plant names are obviously corruptions from the Arabic and it is not always clear whether the name has been properly absorbed into the Fur language or whether it is being used by an Arabic-speaking Fur. Some plants appear to have several names, often just a variation in pronunciation; there is always the possibility that a name has been incorrectly applied.

The Arabic names used in Darfur do not necessarily apply elsewhere in the Sudan. As a general rule, vernacular names should not be used outside the district of their origin.

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